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# FLORA

OF

# WEST TROPICAL AFRICA

## THE BRITISH WEST AFRICAN COLONIES, BRITISH CAMEROONS, THE FRENCH AND PORTUGUESE COLONIES SOUTH OF THE TROPIC OF CANCER TO LAKE CHAD, AND FERNANDO PO.

BY
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# PHYLOGENETIC SEQUENCE OF ORDERS (COHORTS) AND FAMILIES CONTAINED IN VOLUME II. PART 1.

(The cross-lines show breaks in affinity.)

## METACHLAMYDEAE

### Ericales

113. Ericaceae

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### Ebenales

114. Ebenaceae
115. Hoplestigmataceae
116. Sapotaceae

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### Myrsinales

117. Myrsinaceae

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### Styracales

118. Styracaceae

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### Loganiales

119. Loganiaceae
120. Oleaceae

### Apocynales

121. Apocynaceae
122. Asclepiadaceae

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### Rubiales

123. Rubiaceae

### Asterales

124. Dipsacaceae
125. Compositae

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### Gentianales

126. Gentianaceae

### Primulales

127. Primulaceae
128. Plumbaginaceae

### Plantaginales

129. Plantaginaceae

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### Campanales

130. Campanulaceae
131. Lobeliaceae
132. Goodeniaceae

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### Polemoniales

133. Hydrophyllaceae

### Boraginales

134. Boraginaceae

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### Solanales

135. Solanaceae
136. Convolvulaceae

### Personales

137. Scrophulariaceae
138. Orobanchaceae
139. Lentibulariaceae
140. Gesneriaceae
141. Bignoniaceae
142. Pedaliaceae
143. Acanthaceae

### Lamiales

144. Verbenaceae
145. Labiatae

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# 113. ERICACEAE

Shrubs or undershrubs, rarely trees; leaves mostly alternate or whorled, simple, usually evergreen; stipules absent. Flowers actinomorphic or slightly zygomorphic. Calyx persistent, deeply divided. Corolla hypogynous, gamopetalous, inserted below a fleshy disk; lobes contorted or imbricate. Stamens usually double the number of the corolla-lobes, or if the same number then alternate with them, hypogynous; filaments and anthers free; anthers 2-celled, opening by apical pores. Ovary superior, several-celled, with numerous ovules on axile placentas, rarely 1-ovulate; style simple. Fruit a capsule, berry or drupe. Seeds with fleshy endosperm and straight embryo, sometimes winged.

Generally distributed, but rare in the tropics and mostly on the mountains; very numerous in the south-western region of South Africa. Amongst African families recognised by the small flowers, hypogynous stamens within a gamopetalous corolla, and the anthers opening by apical pores.

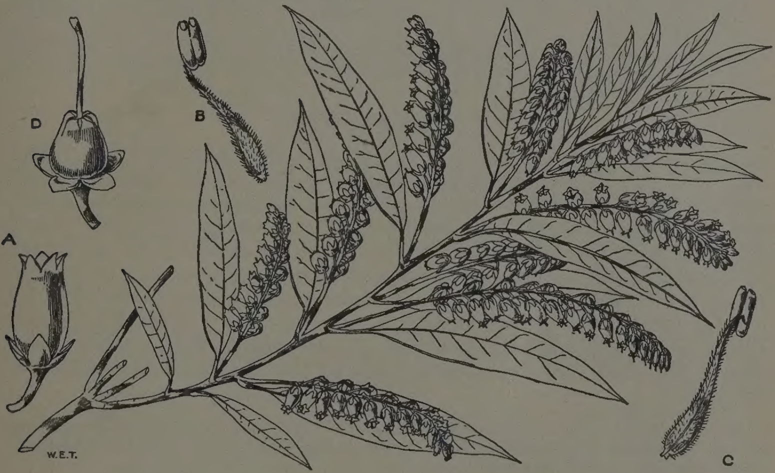

FIG. 178.—AGAURIA SALICIFOLIA *Hook. f.* (ERICACEAE).
A, flower. B and C, stamens. D, calyx and pistil.

Leaves lanceolate, acuminate, fairly large; corolla not persistent; flowers in racemes .. 1. **Agauria**
Leaves very small and heath-like; corolla persistent; flowers not in racemes:
  Small tree or shrub with puberulous branches, not glandular; corolla shortly campanulate .. .. .. .. .. .. .. .. 2. **Philippia**
  Small wiry undershrub covered with bristly gland-tipped hairs; corolla tubular, expanded above .. .. .. .. .. .. .. .. 3. **Blaeria**

## 1. AGAURIA Hook. f.—F.T.A. 3 : 483.

Shrub or small tree; branchlets purplish; leaves lanceolate, acute at both ends, more or less acuminate at the apex, 6–8 cm. long, 1.5–3 cm. broad, glabrous, glaucous below; petiole about 1 cm. long; flowers in short racemes; pedicels 3–4 mm. long; calyx deeply 5-lobed, pubescent outside; corolla deciduous, cylindric, about 8 mm. long, ribbed, shortly 5-lobed; stamens 10, filaments pubescent; fruit a capsule, 5-angled, 4–8 mm. diam.; seeds curved .. .. .. .. .. *salicifolia*

**A. salicifolia** *Hook. f.* ex *Oliv.*—F.T.A. 3 : 483; Bot. Mag. t. 3286 (as *Andromeda salicifolia* Comm.). A small tree, attaining about 25 ft. in height, in the grass highlands above the forest.

S. Nigeria: Cameroons Mt., 5,000–10,000 ft. (Dec.–Feb. & May)! Fernando Po, 8,000–9,000 ft. (Dec.)! Apparently variable as to shape of leaves; widely spread through the East African mountains and Mascarene Islands. Exsicc.—*Mann* 621; 1209; 2182. *Johnston* 12. *Dunlap* 186. *Dalz.* 8305. *Deistel* 74. (See Appendix).

### 2. **PHILIPPIA** Klotzsch—F.T.A. 3 : 484 (under *Ericinella* Klotzsch).

Small tree or shrub; older branches reticulate with lines of short barbellate hairs, younger ones scabrid; leaves erect, in whorls of three, oblong-lanceolate, 3 mm. long, grooved, minutely scabrid on the margin; flowers few at the apex of each branchlet; pedicels glabrous, about 2 mm. long; calyx-lobes 4, broadly triangular; corolla campanulate, 1-5 mm. long; stamens 4–6, included; anthers not appendaged; stigma broadly peltate .. .. .. .. .. .. .. *Mannii*

**P. Mannii** *Alm & Th. Fries* in Kungl. Svensk. Vet. Handl. 4 : No. 4, 37, taf. 4, a, fig. 10 M. *Ericinella Mannii* Hook. f.—F.T.A. 3 : 484. Shrubby, up to 12 ft. or more, with erect broom-like branches, and small purplish flowers.

Cameroons Mt., upper grasslands up to 12,000 ft. (Nov.–May) ! Fernando Po, to summit (Dec.) ! Also in the Bambuto Mts., French Cameroons. Exsicc.—*Mann* 287; 1289; 2181. *Johnston* 104. *Deistel* 81. *Mildbr.* 10926.

### 3. **BLAERIA** Linn.—F.T.A. 3 : 484.

Small wiry undershrub, covered with long bristly gland-tipped hairs; leaves in whorls of three, lanceolate, 2–3 mm. long, thick, with recurved margins, covered with bristly gland-tipped hairs; flowers axillary; pedicels very short; calyx-lobes linear, about $\frac{1}{3}$ as long as the corolla; corolla 3–4 mm. long, glabrous, slightly expanded above, 4-lobed, lobes ovate; stamens 4, scarcely exserted; style exserted; fruit pubescent *Mannii*

**B. Mannii** *Engl.* Bot. Jahrb. 43 : 366; Alm & Th. Fries in Act. Hort. Berg. 8 : 245, t. 5–6, f–g. *B. spicata* Oliv. F.T.A. 3 : 484, partly, not of Hochst. *B. Mannii* forma *parviflora* and var. *bambuttensis* Alm. & Th. Fries l.c. 246. *B. dicranotricha* Mildbr. A heath-like shrublet a few inches to a foot or more high, with small purplish flowers.

S. Nigeria: Cameroons Mt., abundant in the grass highlands, 6,000–11,000 ft. (Nov.–Feb.) ! Fernando Po, 9,000 ft. to summit (Dec.) ! Also in the Bambuto Mts., French Cameroons. Exsicc.—*Mann* 592; 1280; 2177. *Johnston* 7; 91. *Preuss* 712. *Kalbreyer* 127. *Deistel* 166. *Mildbr.* 7176; 10837; 10887; 10904. *Maitland* 651; 814; 947.

## 114. EBENACEAE

Trees or shrubs with often hard and black wood. Leaves alternate, entire; stipules absent. Flowers mostly unisexual, often diœcious, the male with a rudimentary ovary, the female with imperfect or no stamens; females usually solitary. Calyx 3-6-lobed, persistent and often accrescent in fruit. Corolla 3-7-lobed, lobes imbricate. Stamens hypogynous or inserted near the bottom of the corolla, 2–4 times as many as the corolla-lobes, rarely the same number and alternate with them; filaments free or united in pairs; anthers 2-celled, introrse, opening lengthwise. Ovary superior, 3- or more-celled; style often divided. Ovules 1–2 in each cell, pendulous from the inner angle. Fruit a berry. Seeds with a thin testa; embryo half as long as the endosperm, with foliaceous cotyledons.

Mainly in the tropics and subtropics of the Old World, and in North America. The unisexual flowers with the stamens double or more than double the number of the corolla-lobes are distinguishing features.

Flowers 4–5-merous; ovary 4- or 8-celled .. .. .. .. 1. **Diospyros**
Flowers 3-merous; ovary 3- or 6-celled .. .. .. .. .. 2. **Maba**

### 1. **DIOSPYROS** Dalech.—F.T.A. 3 : 517.

Leaves cordate at the base; branchlets clothed with long slender hairs:

Leaves oblong or obovate-oblong, gradually acuminate, 12–17 cm. long, 4–6 cm. broad, with about 6 pairs of prominent nerves below, shortly pubescent on the midrib on both sides, otherwise glabrous; flowers axillary, solitary; pedicels about 1 cm. long, bracteate at the base; sepals narrowly ovate, 1·5–2 cm. long, ciliate 1. *Staudtii*

Leaves ovate or ovate-elliptic, acutely acuminate, 7–12 cm. long, 3–6 cm. broad, with about 6 pairs of prominent nerves below, pilose on the nerves and more or less glaucous; flowers axillary, the males clustered, the females solitary, all covered with spreading rusty soft hairs; sepals linear, about 8 mm. long; fruits oblong-ellipsoid, 4 cm. long, beaked, glabrous .. .. .. .. .. .. 2. *Barteri*

Leaves cuneate or at most rounded at the base; branchlets usually without long hairs:

*Calyx truncate or slightly regularly dentate:

Leaves alternate:

Leaves long-acuminate, oblong-elliptic, 8–12 cm. long, the acumen about 2 cm. long, with 3–4 pairs of lateral nerves, glabrous; flowers axillary, solitary, sessile; calyx quite truncate, leathery, glabrous, 3 mm. long; corolla glabrous 3. *longicaudata*

Leaves shortly and bluntly acuminate :

Corolla glabrous ; leaves broadly elliptic, 10–18 cm. long, 5–8 cm. broad, with about 5 pairs of lateral nerves impressed above, glabrous ; flowers few, axillary, subsessile ; calyx 1·5 mm. long, glabrous .. .. .. 4. *insculpta*

Corolla silky outside ; leaves oblong-elliptic, 10–20 cm. long, 4–8 cm. broad, glabrous and glaucous below, with 6–7 pairs of lateral nerves ; petiole 1 cm. long ; flowers in small clusters ; calyx shortly dentate, 5 mm. long ; corolla 1 cm. long ; fruit broadly oblong, slightly constricted in the middle, 2·5–3 cm. long, flat on the top, nearly glabrous when mature .. .. 5. *sanza-minika*

Leaves opposite, elongate-oblong, 15–30 cm. long, 5–10 cm. broad, pinkish-glaucous below, with about 7–10 pairs of lateral nerves but scarcely visible tertiary nerves ; petiole stout, 1 cm. long ; male flowers in axillary clusters, tomentose ; young fruits narrowly ovoid, velvety and bristly, beaked .. .. 6. *macrophylla*

**Calyx more or less deeply lobed or split down one side :

Calyx elongated, cylindric, shortly split down one side, about 1·2–1·5 cm. long, closely and shortly pubescent outside ; leaves obovate, long-cuneate at the base, 9–15 cm. long, 5–7 cm. broad, with tufts of hairs in the axils of the 6–8 pairs of lateral nerves ; fruit ovoid, about 4 cm. long, the persistent calyx velvety on both sides .. .. .. .. .. .. .. .. .. 7. *monbuttensis*

Calyx short and regularly toothed or lobed :

Leaves not or hardly acuminate :

Leaves glabrous below, more or less oblong, up to 15 cm. long and 5 cm. broad, with numerous slender lateral nerves ; male flowers in shortly stalked clusters, silky-hairy ; male calyx divided nearly to the middle ; female flowers solitary ; fruit ellipsoid, shortly beaked, 2–2·5 cm. long, appressed-hairy 8. *mespiliformis*

Leaves shortly appressed-pubescent below, elliptic, mucronate, 4–8 cm. long, 2–3·5 cm. broad, paler below, with 4–6 pairs of distinct lateral nerves ; male flowers in sessile axillary clusters, appressed-pubescent ; fruits ovoid-ellipsoid, 2–3 cm. long .. .. .. .. .. .. .. .. 9. *tricolor*

Leaves distinctly acuminate :

Male calyx-lobes narrowly lanceolate, acuminate, about 4–5 mm. long, appressed-pubescent or villous outside ; male flowers in axillary subsessile clusters :

Leaves elliptic or oblong-elliptic, up to 15 cm. long and 8 cm. broad, glaucous below and shortly pubescent ; female flowers solitary, shortly stalked ; corolla 2 cm. long, tomentose ; fruit deeply 4-grooved, ellipsoid, 3·5 cm. long, tomentose .. .. .. .. .. .. .. .. 10. *kamerunensis*

Leaves oblong-elliptic, about 15 cm. long and 6 cm. broad, glabrous and pinkish-glaucous below ; female flowers not seen ; male corolla beaked in bud 11. *Mannii*

Leaves ovate or ovate-elliptic, acutely triangular-acuminate, 9–13 cm. long, 5–7 cm. broad, minutely puberulous below with longer hairs on the nerves ; branchlets closely tomentellous ; male flowers in axillary clusters, shortly pedicellate, silky-tomentellous .. .. .. .. 12. *liberiensis*

Male calyx-lobes very short and not acuminate, sometimes broadly triangular :

Branchlets glabrous :

Male flowers small or medium-sized, in a cluster, female often solitary :

Leaves oblong, with almost straight sides, 15–25 cm. long, 5–8 cm. broad, glabrous ; male flowers glabrous ; calyx about 3 mm. long ; corolla acute in bud .. .. .. .. .. .. .. .. 13. *xanthochlamys*

Leaves elliptic-obovate, with curved sides, up to 35 cm. long and 15 cm. broad, glabrous ; male and female flowers clustered on the old wood ; female calyx accrescent, 8 mm. long, lobes reduplicate-valvate.. 14. *Preussii*

Leaves oblong-elliptic, about 10 cm. long and 4 cm. broad, glabrous, abruptly acuminate ; male flowers axillary ; calyx-lobes ovate-triangular, 7 mm. long ; corolla obtuse in bud.. .. .. .. .. 15. *bipindensis*

Male flowers large and subsolitary ; calyx slightly pubescent outside, 1 cm. long ; corolla tomentellous ; leaves oblong, caudate-acuminate, subacute at the base, 14–20 cm. long, 5–6 cm. broad, glabrous, with about 8 pairs of lateral nerves ; fruit broadly ellipsoid, 6 cm. long, 4–5 cm. diam. ; about 9-celled, glabrous .. .. .. .. .. .. .. 16. *crassiflora*

Branchlets more or less pubescent :

Leaves elongate-oblong-elliptic, 3 times as long as broad, up to 30 cm. long and 12 cm. broad ; calyx hispidulous with dark hairs, scarcely 1 cm. long, with broadly triangular lobes ; corolla tomentose, about 2 cm. long ; fruit depressed-globose, 3 cm. diam., hispid, girt by the closely appressed persistent calyx 17. *gabunensis*

Leaves ovate or shortly oblong-elliptic :

Female calyx as long as the fruit, deeply lobed, the lobes broadly ovate ; leaves ovate, rather gradually acuminate, 10–12 cm. long, 5–6 cm. broad 18. *atropurpurea*

Female calyx not as long as the fruit, shortly lobed :
Leaves gradually acuminate, paler below ; flowers tomentose:
Tertiary nerves not or scarcely visible ; leaves narrowly oblong-elliptic, mostly shortly cuneate at the base, 6–9 cm. long, 2–4 cm. broad ; fruits oblong-ellipsoid, 2·5 cm. long .. .. .. .. 19. *Heudelotii*
Tertiary nerves rather faint ; leaves oblong-elliptic, slightly cuneate, 9–13 cm. long, 3–5·5 cm. broad ; lateral nerves 6 pairs ; calyx 1 cm. long, rusty tomentose, lobes triangular .. .. .. .. 20. *Talbotii*
Tertiary nerves very conspicuous and parallel ; leaves oblong to broadly ovate-elliptic, rounded at the base, up to 14 cm. long and 7 cm. broad ; fruits ovoid, up to 6 cm. long .. .. .. .. 21. *Thomasii*
Leaves very abruptly acuminate, glabrous below, 8–10 cm. long, 3–4·5 cm. broad ; flowers glabrous :
Lateral nerves numerous .. .. .. .. .. 22. *piscatoria*
Lateral nerves about 6 pairs .. .. .. .. 23. *polystemon*

1. **Diospyros Staudtii** *Gürke* in Engl. Bot. Jahrb. 26 : 65. A shrub 6–20 ft. high with hairy branches.
S. Nigeria : Eket ! Also in Cameroons and Gabon. Exsicc.—*Talb.* 3320.

2. **D. Barteri** *Hiern*—F.T.A. 3 : 521. *D. rubicunde* Gürke. *D. hirta* Gürke. A shrub 5 ft. high or climbing, rusty-hirsute on the young parts, the leaves conspicuously glaucous below.
Gold Coast : Akwapim, in secondary forest (fr. Apr.) ! Aburi (July) ! S. Nigeria : Lagos, Ikoyi (Jan.–Apr.) ! Lagos Colony (Aug.) ! Benin, Okomo (fr. Mar.) ! Likomba ! Also in Cameroons. Exsicc.—*Barter* 2194. *Rowland.* *Johnson* 1086. *Dalz.* 1099 ; 1180. *Mildbr.* 10522. (See Appendix).

3. **D. longicaudata** *Gürke*, MS. A shrub or tree ?
S. Nigeria : Johann Albrechtshöhe ! Also in French Cameroons. Exsicc.—*Staudt* 943.

4. **D. insculpta** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Branchlets dark-purple, glabrous.
S. Nigeria : Oban ! Exsicc.—*Talb.* 1609.

5. **D. sanza-minika** *A. Chev.* Vég. Util. Afr. Trop. Franç. 5 : 155 ; Chev. Bot. 397. *D. nsambensis* Gürke. A large forest tree with black bark, glabrous branchlets and pale leaves glaucous below ; flowers in almost sessile cymes mostly on the leafless older branches.
Sierra Leone : Kennema (fr. Jan.) ! Gold forest (fr. Jan.) ! Kambui Reserve ! Liberia : Dukwia R. (fr. Apr.) ! Ivory Coast : Zaranou (fr. Mar.) ! Sanvi and Cavally basins (fl. Aug.) ! Gold Coast : Ashanti forests ! Extends to Gabon. Exsicc.—*Unwin & Smythe* 40. *Lane-Poole* 224. *N. W. Thomas* 7654. *Greene* 929. *G. P. Cooper* 71 ; 271 ; 422. (See Appendix).

6. **D. macrophylla** *A. Chev.* in Journ. de Bot. 1909 : 116 ; Bot. 396. A shrub with long leaves pale below, stout branchlets dark brown tomentose, yellowish-white flowers and ovoid, beaked fruits, 1½ in. long, covered when young with dense rusty tomentum and bristly hairs.
Liberia : Banga (fl. and fr. Oct.) ! Dukwia R. (fr. Feb., Nov.) ! Ivory Coast : several localities ! Exsicc.—*Linder* 1158 ; 1215. *G. P. Cooper* 130 ; 200. *Chev.* 16143 ; 17078 ; 19289 ; 19318 ; 19659. (See Appendix).

7. **D. monbuttensis** *Gürke* l.c. 66 ; Holl. 3 : 426 ; Chev. Bot. 397. *D. senensis* Hiern F.T.A. 3 : 520, partly, not of Klotzsch. A shrub or small tree of the forest, up to 30 ft. high, branched from the base, with nearly glabrous branches, and yellowish flowers with a cylindrical calyx.
Ivory Coast : Nzi valley, Lanquira to Buakro (July) ! Korakissikro (Aug.). Gold Coast : Kwahu (fr. June) ! Togo : several localities ! Dahomey : Allada, between Koussi and Haevitegi (Feb.). S. Nigeria : several localities ! Also in Cameroons and E. Sudan. Exsicc.—*Barter* 290 ; 3251 ; 3390. *Irving* 141. *Rowland.* *Millen* 163. *Dawodu* 58. *Punch* 130. *Farquhar* 26. *Foster* 59 ; 210. *Kersting* A 637. *Vigne* 1765. (See Appendix).

8. **D. mespiliformis** *Hochst.*—F.T.A. 3 : 518 ; Holl. 3 : 425 ; Lely 48 ; Gürke in Engl. Bot. Jahrb. 43 : 200, fig. 1 ; Chev. Bot. 397. A tree 30–60 ft. or more high in both mixed deciduous and savannah forests, occasionally on the open coastal lands.
French Sudan and Senegal to N. Nigeria ; also in S. Nigeria, chiefly in the Western Province ; extending to Ubangi-Shari, Abyssinia, Upper Belgian Congo, East Africa, Rhodesia and S.W. Tropical Africa. Exsicc.—*Barter* 1208 ; 1334. *Elliott* 162 ; 215. *Roger* 24. *Warnecke* 325 ; 330. *Kersting* A 552. (See Appendix).

9. **D. tricolor** *Hiern*—F.T.A. 3 : 521 ; Gürke in Engl. Bot. Jahrb. 43 : 203, fig. 2 ; Chev. Bot. 398. A much-branched shrub 3–6 ft. high, with more or less zigzag rusty-silky branchlets and pale underleaf, characteristic of sandy lands near the sea ; the fruit is yellow-red, about 1 in. long, and somewhat 3-angled.
Togo : Lome (fr. Jan.) ! Dahomey : Kotonou ! S. Nigeria : Lagos, Ikoyi (Feb.) ! Also in Gabon. Exsicc.—*Barter* 2199 ; 2234. *Dalz.* 1181. *Warnecke* 26 ; 310.

10. **D. kamerunensis** *Gürke* l.c. 26 : 69, and 43 : 208, fig. 3, M-O. *D. pallescens* A. Chev. Bot. 397. A small tree up to 30 ft. or more high, with golden-pubescent branchlets and inflorescence, and pale green leaves yellowish-grey below ; fruit orange-coloured when ripe.
Liberia : Dukwia R. (Apr.) ! Gold Coast : Kumasi ! Imbraim (fr. Mar.), Banka, S. Ashanti (Sept.) ! Axim (fr. Mar.) ! Also common in Cameroons. Exsicc.—*Cummins* 201. *Thompson* 19. *Greene* 852 ; 928. *Vigne* 1363. *Chev.* 17686 ; 17728. *G. P. Cooper* 69 ; 116 ; 304. (See Appendix).

11. **D. Mannii** *Hiern* [1]—F.T.A. 3 : 524 ; Chev. Bot. 396. A tree about 40 ft. high, with densely pilose branchlets and pinkish-glaucous leaves, and axillary clusters of small flowers with silky calyx.
Ivory Coast : Yapo, in the forest (Oct.) ! Sanvi ; between the Middle Sassandra and the Middle Cavally. Also in Gabon. Exsicc.—*Chev.* 22319 ; 17695 ; 19296.

12. **D. liberiensis** *A. Chev.* Bot. 396, name only. A tree (?) with axillary clusters of small male flowers.
Ivory Coast : Lower Cavally, Prolo (Aug.) ! Exsicc.—*Chev.* 19857.

13. **D. xanthochlamys** *Gürke* in Engl. Bot. Jahrb. 43 : 210. *Maba coriacea* Cummins ; Chev. Bot. 395. A small to medium-sized tree up to 30–45 ft. high of the evergreen forest, with grey-green coriaceous leaves and small white flowers clustered in the upper axils or on the older branches.
Ivory Coast : Soubiré ! Gold Coast : Kumasi ! E. Prov. Akim (June) ! Amonum (Aug.) ! Also in Cameroons. Exsicc.—*Cummins* 119 ; 242. *Johnson* 738. *Chipp* 539.

14. **D. Preussii** *Gürke* l.c. 14 : 313, and 26 : 71. *D. Le-Testui* Pellegr. A shrub or small tree 10–12 ft. high, with small flowers in crowded clusters on the older wood ; fruit yellow-brown, smooth, about 1 in. long enclosed in the enlarged calyx.
S. Nigeria : Oban ! Victoria. Barombi-ba-Mbu. Also in French Cameroons and Gabon. Exsicc.—*Talb.* 1329.

15. **D. bipindensis** *Gürke* l.c. 26 : 70. *D. flavovirens* Gürke. *D. Buesgenii* Gürke.
S. Nigeria : Between Victoria and Bimbia (Apr.) ! Johann-Albrechtshöhe ! Also in French Cameroons and N. E. Congo. Exsicc.—*Preuss* 1222. *Buesgen* 157.

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[1] Determination somewhat doubtful, the material being insufficient.

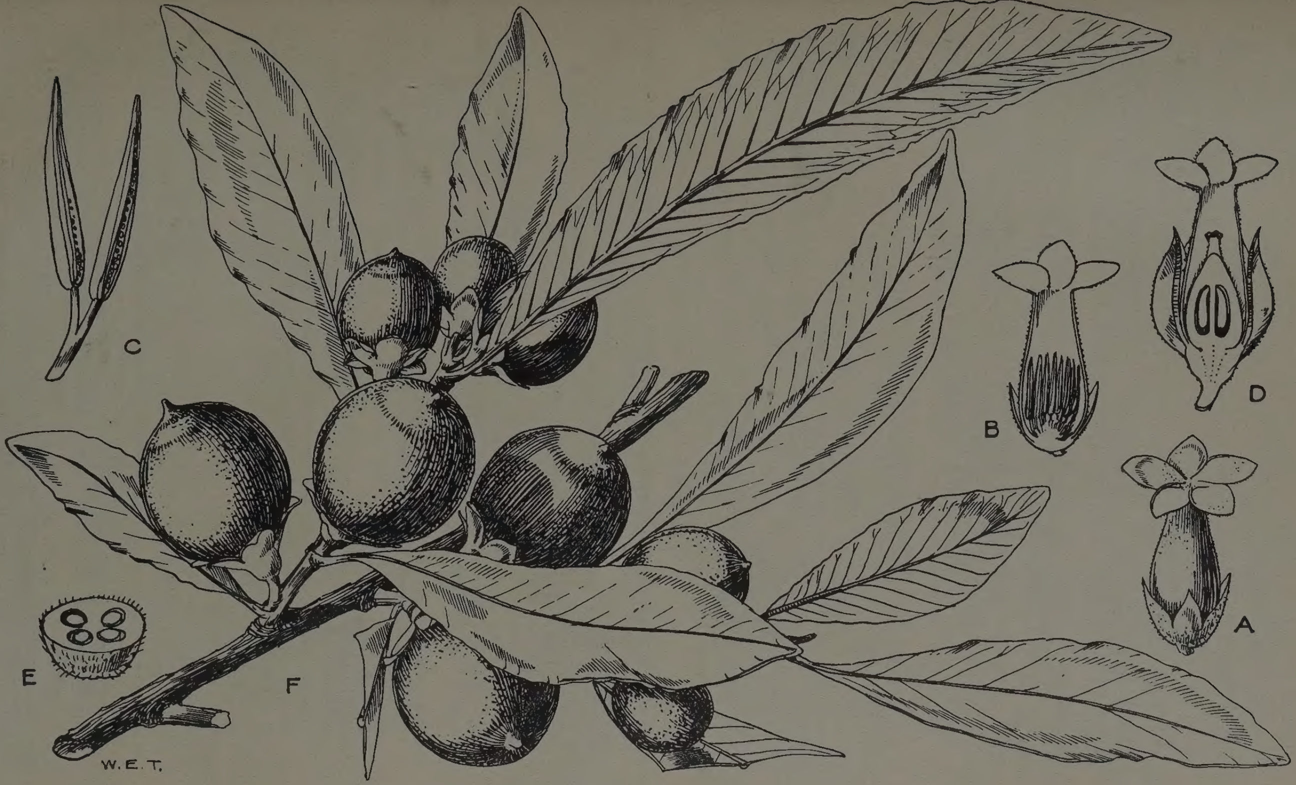

FIG. 179.—DIOSPYROS MESPILIFORMIS *Hochst.* (EBENACEAE).
A, male flower. B, longitudinal section of male flower. C, stamens. D, longitudinal section of female flower. E, cross-section of ovary. F, shoot with fruit.

16. **D. crassiflora** *Hiern*—F.T.A. 3 : 525. *D. incarnata* Gürke. A medium-sized forest tree nearly glabrous except on the inflorescence, with fairly large axillary flowers ; fruit about 2 in. long.

S. Nigeria : Emma, Benin district (fr. Aug.) ! Calabar (Mar.) ! Also in French Cameroons. Exsicc.—*Thomson* 47. *Unwin* 196. (See Appendix).

17. **D. gabunensis** *Gürke* in Engl. Bot. Jahrb. 26 : 72. *D. Gilgiana* Gürke l.c. 43 : 206, fig. 3, K–O. *D. mamiacensis* Gürke. A tree 30–60 or more ft. high with slender bole and fairly large subsessile axillary flowers with blackish brown-tomentose calyx ; fruit about 1¼ in. diam.

Sierra Leone : Kembui, Hangha (Sept.) ! Liberia : Dukwia R. (fl. Apr., fr. Oct.) ! Ivory Coast : Grabo, Mt. Copé. Gold Coast : Tarkwa district, Popokyere ! S. Nigeria : Johann-Albrechtshöhe (Apr.) ! Also in French Cameroons and Gabon. Exsicc.—*Aylmer* 243. *G. P. Cooper* 78 ; 87. *Linder* 641 ; 988. *Chipp* 247. *Staudt* 958. *Chev.* 19665. (See Appendix).

18. **D. atropurpurea** *Gürke* l.c. 26 : 67, and 43 : 211, fig. 4. A small or medium-sized tree with slender smooth branchlets and reddish flowers, shortly pedicellate, singly or few in the leaf axils ; the fruit is surrounded by the enlarged deeply lobed calyx ; the leaves turn blackish in drying.

S. Nigeria : Abeokuta district ! Benin ! Also in Cameroons. Exsicc.—*Thompson* 4. *Dennett* 27. (See Appendix).

19. **D. Heudelotii** *Hiern*—F.T.A. 3 : 524 ; Chev. Bot. 396. *D. gracilescens* Gürke (?). *D. guineensis* A. Chev. *D. apiculata* A. Chev. Bot. 395. *Maba cinnabarina* Gürke (as to *Zenker* 3466 in Herb. Kew). A small tree 12–20 ft. or more high ; leaves pale and more or less glaucous below, and brownish-tomentose flowers in axillary clusters.

Senegal : Casamance, Sinedon (Jan.) ! French Guinea : Futa-Jallon ! Mamou (Mar.) ! Kissidugu (Feb.) ! Sierra Leone : various localities ! Ivory Coast : Anoumaba ! Cameroons Mt., Likomba Plantation ! Also in French Cameroons. Exsicc.—*Heudelot* 638. *Sc. Elliot* 4509 ; 4585 ; 5367. *Mildbr.* 10531 ; 10595. *Chev.* 16720 ; 17414 ; 17540 ; 19202. (See Appendix).

20. **D. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 57. An elegant tree up to about 90 ft. high, with yellow-brown flowers ¾ in. long, in rusty-tomentose cymes of 2 or 3 flowers on the older branches and covered with stinging hairs when mature.

S. Nigeria : Oban ! Also in Portuguese Congo. Exsicc.—*Talb.* 1560.

21. **D. Thomasii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A tree 15–25 ft. or more high, with leaves shining above but pubescent and greyish or vinous-glaucous below, and fruits brownish-grey shortly tomentose, 1 in. in diameter.

Sierra Leone : Bumbuna (Oct.) ! Pujehun (Feb.) ! York Pass ! Liberia : Peahtáh (Oct.) ! Gbanga (Sept.) ! Dukwia R. (Mar., Apr., fr. Nov.) ! Exsicc.—*N. W. Thomas* 3293 ; 8437. *Lane-Poole* 109 ; 433. *Linder* 481 ; 895. *G. P. Cooper* 129 ; 261 ; 378. (See Appendix).

22. **D. piscatoria** *Gürke* l.c. 46 : 155 ; Chev. Bot. 397. *Maba soubreana* A. Chev. Bot. 395, name only. A glabrous tree, 15 to 45 ft. high, with shining dark green leaves drying almost black, and small flowers in short cymes in the upper axils.

Ivory Coast : various localities ! Gold Coast : Dunkwa ! Also in Cameroons. Exsicc.—*Vigne* 190. *Chev.* 16331, etc. (See Appendix).

23. **D. polystemon** *Gürke* in Engl. Bot. Jahrb. 43 : 210. A tree 30–50 ft. high.

Cameroons Mt., Likomba Plantation, rain forest (Dec.) ! Also in French Cameroons. Exsicc.—*Mildbraed* 10754.

## 2. **MABA** Forst.—F.T.A. 3 : 514.

Leaves deeply emarginate at the apex, obliquely and narrowly ovate, broadly cuneate at the base, 3–6 cm. long, 1·5–2 cm. broad, midrib prominent on both sides, pustulate ; branchlets pubescent ; male flowers solitary ; calyx obsoletely 4-toothed ; corolla tubular, 3-toothed ; stamens 9 ; anthers pilose .. .. .. 1. *kamerunensis*

Leaves not emarginate :

Calyx and corolla glabrous or nearly so outside :

Corolla-buds rounded at the apex :

Leaves long-caudate-acuminate, oblong-ovate, 9–12 cm. long, 3–4·5 cm. broad, blackish when dry, glabrous ; lateral nerves 5 pairs, looped ; flowers about 3 in each leaf-axil, subsessile ; calyx cupular, truncate, 4 mm. long ; corolla-bud ovoid ; fruit shortly oblong, truncate, about 1 cm. long, finely wrinkled 2. *Zenkeri*

Leaves broadly-pointed, oblong-lanceolate, 5–9 cm. long, 2–3 cm. broad, with several pairs of slender finely reticulate lateral nerves ; flowers crowded in the leaf-axils, subsessile .. .. .. .. .. .. .. .. 3. *Warneckei*

Corolla-buds acute at the apex :

Leaves ovate-lanceolate, gradually and obtusely acuminate, broadest below the middle, 6–12 cm. long, 3–6 cm. broad, glabrous, with about 5 pairs of lateral nerves ; male flowers axillary, few, subsessile ; calyx-lobes rounded, slightly ciliate ; fruits subglobose, 2 cm. diam., shining, 6-seeded .. .. 4. *Mannii*

Leaves more or less oblong, rather abruptly or long-acuminate, about 2 cm. broad and up to 7 cm. long, rather gradually acuminate ; flowers shortly pedicellate ; calyx truncate .. .. .. .. .. .. .. .. 5. *Cooperi*

Calyx and corolla villous outside :

Leaves oblong-lanceolate, gradually acuminate, 4–8 cm. long, 2–3 cm. broad, shortly pilose on the midrib below, with several pairs of finely reticulate nerves ; petioles and branchlets pubescent ; flowers axillary, solitary, all arranged to one side ; calyx about 5 mm. long ; fruit oblong-ellipsoid, curved, 1·5 cm. long, becoming glabrous, girt by the cupular persistent calyx .. .. .. .. 6. *lancea*

Leaves elliptic or obovate-elliptic, obtuse, 3·5–7 cm. long, 2·5–3·5 cm. broad, with undulate margins, reticulate below ; flowers few together in the leaf-axils ; calyx 3 mm. long .. .. .. .. .. .. .. .. 7. *buxifolia*

1. **Maba kamerunensis** *Gürke* in Engl. Bot. Jahrb. 46 : 150. A small tree 10–15 ft. high, the leaves without visible lateral nerves, young foliage reddish, turning black in drying.

Cameroons Mt., Likomba (Nov.) ! Also in French Cameroons and Spanish Guinea. Exsicc.—*Mildbr.* 10627.

2. **M. Zenkeri** *Gürke* in Engl. Bot. Jahrb. 26 : 63. A small shrub or tree up to 20 ft. ; leaves and flowers nearly black when dry.
Cameroons Mt., Victoria, in the forest (Apr.) ! Also in French Cameroons. Exsicc.—*Maitland* 619.

3. **M. Warneckei** *Gürke* in Engl. Bot. Jahrb. 46 : 151. A shrub or small to medium-sized tree up to 40 ft. high, with stiff almost coriaceous leaves.
Togo : Lome (fl. & fr. Aug.) ! Kodjeloa (Feb., young fr. July) ! Exsicc.—*Warnecke* 220. *Kersting* 500 ; 689. *Mildbr.* 7506.

4. **M. Mannii** *Hiern*—F.T.A. 3 : 516 ; Holl. 3 : 423. *M. Elliotii* Hiern. A small tree or a shrub, nearly glabrous, with shining half-coriaceous leaves.
Sierra Leone : various localities (Feb.–Apr.) ! N. Nigeria : Lokoja (Nov.) ! Nupe ! Gurara R., near Gornapara ! Fernando Po (Nov.) ! Exsicc.—*T. Vogel* 205. *Barter* 1220. *Mann* 839. *Sc. Elliot* 4788 ; 5101 ; 5615 ; 5655. *Elliott* 172. (See Appendix).

5. **M. Cooperi** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A tree up to 40 ft. high with rather thin caudate-acuminate leaves turning blackish in drying.
Liberia : Dukwia R. (Oct.) ! Peáhtah (Oct.) ! Exsicc.—*G. P. Cooper* 92. *Linder* 1029 ; 1066. (See Appendix).

6. **M. lancea** *Hiern*—F.T.A. 3 : 516 ; Chev. Bot. 395. *M. secundiflora* Hutch. *M. sudanensis* A. Chev. A much-branched shrub up to 12 ft. high, the young parts and inflorescence densely yellowish pubescent.
French Guinea : Timbo (Apr.) ! Farana (Apr.). Futa-Jallon, Diaguissa (Apr.) ! Sierra Leone ! N. Nigeria : North Zaria, in a ravine ! Tilde Filani, 3300 ft. (May) ! S. Nigeria : Johann-Albrechtshöhe ! Exsicc.—*Dalz.* 413. *Lely* 229. *Staudt* 617. *Smeathman. Chev.* 766.

7. **M. buxifolia** *Pers.*—F.T.A. 3 : 515 ; Chev. Bot. 394. Usually a much-branched shrub, but occasionally a small tree, with stiff half-coriaceous leaves, the young parts and inflorescence densely yellowish-tomentose.
Ivory Coast : Sassandra Port (May). Tabou, by the sea (Aug.), Beriby (Aug.). Dahomey : Kotonu, amongst dunes by the sea (Mar.) ! Also in St. Thomas Island, Congo and Angola ; widely spread on the coasts of the Old World tropics. Exsicc.—*Debeaux* 345.

## 115. HOPLESTIGMATACEAE [1]

Trees. Leaves alternate, entire ; stipules absent. Flowers hermaphrodite, in terminal cymes. Calyx closed in bud, bursting irregularly. Corolla shortly tubular, with about 3 series of overlapping corolla lobes. Stamens numerous, in several rows inserted at the base of the corolla ; anthers 4-celled, opening by longitudinal slits. Ovary superior, 1-celled with 2 intrusive parietal placentas ; style bilobed nearly to the base, branches sharply bent ; stigmas capitate. Ovules pendulous, one on each side of the bilobed placentas. Fruit hard, with a deep groove up each side, the calyx forming a plate at the base. Seeds with scanty endosperm and long thick straight embryo.

**HOPLESTIGMA** Pierre in Bull. Soc. Linn. Paris 2 : 116 (1898). Characters of the family.

Branchlets tomentose ; leaves broadly obovate-elliptic, rounded and slightly apiculate, narrowed to the base, 15–30 cm. long, 9–15 cm. broad, venulose-reticulate above, softly pubescent below ; lateral nerves about 10 pairs ; petiole tomentose, about 2 cm. long ; cymes terminal, *Cordia*-like, softly tomentose all over ; calyx about 1 cm. long, tomentose, closed in bud, splitting into 3–4 lobes ; corolla 1·5 cm. long ; fruit broadly ellipsoid, 3 cm. long, glabrous .. .. .. .. *Pierreanum*

**H. Pierreanum** *Gilg* in Engl. Bot. Jahrb. 40 : Beibl. 93, 76, with fig. A tree with long slender stem and small crown.
Cameroons Mt., Likomba Plantation (Dec.) ! Also in French Cameroons. Exsicc.—*Mildbr.* 10774.

## 116. SAPOTACEAE

Trees, shrubs, or rarely climbers, often with milky juice. Leaves alternate, entire, leathery ; stipules absent or rare. Flowers hermaphrodite, actinomorphic, usually small. Calyx 4-8-lobed. Corolla 4-8-lobed, lobes 1-2-seriate, imbricate, sometimes with petaloid external appendages. Stamens inserted on the corolla, the fertile ones equalling the corolla-lobes and opposite to them, or more numerous and 2- or more-seriate ; staminodes sometimes present ; anthers opening lengthwise. Ovary several-celled, superior ; style simple. Ovules solitary in each cell, ascending from the inner axil. Fruit 1- many-celled, often a rather hard berry, rarely a capsule. Seeds with a bony, often shining testa, and a large broad hilum ; endosperm mostly scanty ; embryo large, with small radicle and broad foliaceous cotyledons.

Mainly in the tropics and subtropics ; some of considerable economic value. Distinguished by the woody habit, alternate leaves without stipules, and regular flowers, mostly with petaloid staminodes.

This family needs periodic revision in regard to genera as the material of some is still very inadequate. The following key is therefore only tentative.

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[1] See Gilg in Engl. Bot. Jahrb. 40 : Beibl. 93 : 76 (1908).

Corolla-lobes without external appendages :
Flowers borne on the younger branches, not on the main trunk :
Leaves and flowers respectively densely clustered at the top of the shoots ; ovary 8–10-celled ; seeds usually 1, without endosperm ; sepals 8, in two series ; petals usually 8 ; staminodes petaloid, apiculate .. .. .. 1. **Butyrospermum**
Leaves usually not clustered at the top of the shoots ; ovary rarely more than 5-celled ; petals 4–6 :
Hairs on the leaves simple (not medifixed) or absent :
Sepals not united beyond the middle :
Staminodes absent or very small :
Lateral nerves of leaves usually very numerous and close :
Seeds with endosperm .. .. .. .. .. .. 2. **Chrysophyllum**
Seeds without endosperm .. .. .. .. .. 3. **Pachystela**
Lateral nerves of the leaves not numerous, spaced :
Staminodes present .. .. .. .. .. .. 4. **Sersalisia**
Staminodes absent .. .. .. .. .. .. 5. **Delpydora**
Staminodes present, usually more or less petaloid :
Filaments about as long as the anthers .. .. .. 6. **Sideroxylon**
Filaments several times longer than the anthers .. 7. **Bakerisideroxylon**
Sepals united beyond the middle .. .. .. .. .. 8. **Synsepalum**
Hairs on the leaves T-shaped .. .. .. .. .. 9. **Malacantha**
Flowers borne in fascicles on the main trunk ; calyx-lobes spirally arranged ; fruits large, depressed-globose .. .. .. .. .. 10. **Omphalocarpum**
Corolla-lobes with petaloid external appendages (these often appearing to be 3 series of petals) :
Sepals 4 + 4 .. .. .. .. .. .. .. .. 11. **Mimusops**
Sepals 3 + 3 .. .. .. .. .. .. .. .. 12. **Manilkara**

## 1. BUTYROSPERMUM Kotschy.—F.T.A. 3 : 504.

Small tree ; leaves deciduous, clustered at the ends of the shoots, oblong or obovate-oblong, 10–25 cm. long, 5–8 cm. broad, with numerous slender parallel lateral nerves spreading almost at right angles, glabrous, except when young ; petiole up to 10 cm. long ; flowers white, clustered at the end of the shoots ; pedicels about 1·5–2 cm. long, pubescent ; sepals 8 or 10, in two rows, oblong-lanceolate, nearly 1 cm. long, softly tomentose outside ; corolla as long as the calyx, glabrous, lobes 8 or 10, ovate-oblong, glabrous ; staminodes petaloid, elliptic, apiculate, toothed ; stamens 8 or 10 ; ovary 8–10-celled, tomentose ; fruit ellipsoid, 4–5 cm. long, 1-seeded, style persistent.. .. .. .. .. .. .. .. .. *Parkii*

**B. Parkii** *Kotschy*—F.T.A. 3 : 504, partly ; Holl. 3 : 410 ; Lely 30 ; Chev. Bot. 388, incl. vars. ; Engl. Monogr. 22. The Shea butter tree, abundant in the savannah regions from Senegal to Nigeria and N. Cameroons, extending to Ubangi-Shari. The Nile plant, *B. niloticum* Kotschy, is slightly different. (See Appendix).

## 2. CHRYSOPHYLLUM Linn.—F.T.A. 3 : 498.

Leaves cordate at the base, elongate-oblong, abruptly caudate-acuminate, 11–15 cm. long, 5–6 cm. broad, appressed-silky-villous below, with 12–15 pairs of prominent lateral nerves ; petioles very short, slightly decurrent on the shoot ; flowers not seen .. .. .. .. .. .. .. .. .. .. 1. *sericeum*
Leaves not cordate at the base :
Leaves glabrous below :
Trees :
Leaves oblong, very shortly cuneate at the base, abruptly and obtusely acuminate, 5–10 cm. long, 3–5 cm. broad, with very numerous and close lateral nerves ; petiole below 1 cm. long ; flowers axillary, numerous ; pedicels up to 5 mm. long, pubescent ; calyx pubescent ; fruit depressed-globose, 7 cm. diam., with a fleshy exocarp, several-seeded ; seeds up to 5 cm. long, with a narrow lateral scar .. .. .. .. .. .. .. .. .. 2. *pruniforme*
Leaves as above, but larger, 10–16 cm. long, and with about 10 pairs of distant lateral nerves ; petiole 1·5 cm. long ; flowers as above .. 3. *subnudum*
Leaves obovate, rather cuneate at the base, acuminate, 8–25 cm. long, 4–10 cm. broad, with several faint lateral nerves ; petiole 2–3 cm. long, glabrous ; flowers axillary ; pedicels 4–10 mm. long ; buds minutely pubescent 4. *obovatum*
Climbing shrub ; leaves similar to *C. pruniforme* but broadly rounded at the base, shortly acuminate ; flowers very small and pedicels shorter .. 5. *Welwitschii*
Leaves silky or pubescent below :
Leaves silvery below :
Secondary lateral nerves invisible or nearly so below ; leaves elongate-obovate-elliptic, shortly acuminate, cuneate at the base, 12–30 cm. long, 5–9 cm. broad, with 12–15 pairs of distant lateral nerves, finely appressed-pubescent below ; petiole 1–3 cm. long, hoary ; flowers shortly pedicellate ; calyx 3 mm. long, silky ; fruit depressed-globose, 3 cm. diam. .. .. .. .. 6. *albidum*

Secondary lateral nerves distinct :

Flowers sessile ; leaves obovate, broadly acuminate, long-cuneate at the base, 10–17 cm. long, 4–6 cm. broad, closely velvety below, with 15–20 pairs of distinct lateral nerves ; petiole 1–2 cm. long ; flowers densely clustered ; calyx tomentose 7. *glomeruliflorum*

Flowers with pedicels 1·5–2 cm. long .. .. .. .. 13. *Laurentii*

Secondary lateral nerves not visible, veins distinct and reticulate ; leaves oblanceolate, obtusely acuminate, 8–15 cm. long, 2·5–4·5 cm. broad, shortly pubescent below, with 10–15 pairs of prominent lateral nerves ; petiole 1–2 cm. long, pubescent ; flowers subsessile ; calyx-lobes broadly ovate, pubescent, 3–4 mm. long ; corolla-lobes densely white-ciliate .. .. .. .. 8. *metallicum*

Leaves fulvous or golden below :

Leaves large, usually well over 10 cm. long :

Lateral nerves about 10 pairs :

Leaves elliptic-obovate, shortly acuminate, 12–20 cm. long, 5–8 cm. broad, silky-appressed-pubescent below ; petiole 1 cm. long, tomentose ; flowers not seen ; fruits subglobose, 4–5 cm. long, hard and woody, glabrous 9. *giganteum*

Leaves obovate, long-cuneate at the base, not acuminate, 15–30 cm. long, 8–12 cm. broad, brown-velvety and satiny below .. .. .. 10. *macrophyllum*

Lateral nerves about 15 pairs or more :

Lateral nerves 15–20 pairs ; leaves oblong-elliptic, obtuse or shortly pointed, 12–22 cm. long, 6–8 cm. broad, rusty-tomentose below but hairs not appressed ; petiole 2–3 cm. long, tomentellous ; flowers clustered, sessile ; calyx rusty-tomentose ; fruits sessile, globose, 2·5 cm. diam., rusty-tomentose 11. *perpulchrum*

Lateral nerves 20–30 pairs ; leaves elongate-obovate-elliptic, acuminate, 15–30 cm. long, 6–10 cm. broad, finely appressed-tomentellous below ; petiole 2–3 cm. long ; flowers pedicellate, pedicels about 5 mm. long ; calyx 4 mm. long, tomentellous ; fruits shortly stalked, ovoid-globose, 4–5 cm. diam., soon nearly glabrous .. .. .. .. .. .. 12. *africanum*

Lateral nerves very numerous and faint ; leaves elongate-oblanceolate, acute, 15–30 cm. long, 6–7 cm. broad, closely appressed-pubescent below ; petiole up to 2 cm. long ; pedicels 1·5–2 cm. long, minutely tomentellous ; calyx 5 mm. long .. .. .. .. .. .. .. .. 13. *Laurentii*

Leaves small, usually below 10 cm. long, 4–5 cm. broad, broadly elliptic-obovate, mucronate-acuminate, with 12–14 pairs of lateral nerves, rusty-silky below ; petiole 1 cm. long ; flowers sessile, very small ; calyx appressed-tomentose 14. *prunifolium*

1. **Chrysophyllum sericeum** *A. Chev.* Bot. 386, name only. A tree, the leaves brownish yellow, silky below.
Ivory Coast : Indénié, between Zaranou and Bébou (Dec.) ! Exsicc.—*Chev.* 22627.

2. **C. pruniforme** *Engl.* Monogr. Sapot. 42. *C. gracile* A. Chev. *C. Welwitschii* A. Chev. partly, not of Engl. ; Bot. 386. A tree up to about 100 ft. high, with small flowers in axillary clusters and shining finely-veined leaves.
Sierra Leone : several localities ! Ivory Coast : Bingerville, etc. ! Tepo country, Grabo ! Gold Coast : Kwaku Prasu (Feb.) ! Dahomey : Bokoutou forest reserve (Jan.) ! Sakété ! S. Nigeria : Forcados ! Extends to Angola, also from Kenya to Natal. Exsicc.—*Unwin & Smythe* 30. *Dalz.* 958. *Aylmer* 34. *Vigne* 1595. *Unwin* 59. *Chev.* 15419 ; 15473 ; 19708 ; 22863 ; 22888. (See Appendix).

3. **C. subnudum** *Baker*—F.T.A. 3 : 499 ; Engl. Monogr. Sapot. 45, t. xv. E. A tree about 30 ft. high.
S. Nigeria : Johann-Albrechtshöhe (Apr.) ! Extends from Cameroons to Angola. Exsicc.—*Staudt* 960.

4. **C. obovatum** *G. Don*—F.T.A. 3 : 501. A large tree with clear bole and subcoriaceous, leaves pale greyish or yellowish, satiny beneath but glabrous.
Sierra Leone : Freetown (?) ! Kora R. near Moria, Scarcies (Feb.) ! Liberia : Dukwia River (fr. Mar.) ! Exsicc.—*Don. T. Vogel* 71. *Sc. Elliot* 4566. *G. P. Cooper* 113 ; 310 ; 463. (See Appendix).

5. **C. Welwitschii** *Engl.* Bot. Jahrb. 12 : 521 ; Monogr. Sapot. 41 ; Holl. 3 : 398 ; Chev. Bot. 389. *C. ellipticum* A. Chev. A climbing shrub, with small greenish flowers in axillary clusters.
Sierra Leone : Bumban, Port Lokko (Apr.) ! Bendu (Gardohun-Jimmi, Apr.) ! Kumrabai ! Ivory Coast : several localities ! Dahomey : Adjara ! Also in Angola. Exsicc.—*Sc. Elliot* 5673. *Smythe* 202. *Deighton* 1598. *Chev.* 16341 ; 22576 ; 22753.

6. **C. albidum** *G. Don*—F.T.A. 3 : 500 ; Engl. Monogr. Sapot. 45, t. xv. C. ; Holl. 3 : 397 ; Chev. Bot. 386. *C. Millenianum* Engl. *C. Kayei* S. Moore. A tall tree, with the branchlets and leaves below whitish fine-tomentose, and small flowers amongst or below the upper leaves.
Ivory Coast : Bouroukrou (Dec.). Gold Coast : Abofaw, Ashanti ! Aburi ! Dahomey : Sakété (Jan.) ; Lagnanado, Abbo (Feb.) ! S. Nigeria : Lagos ! Lagos Colony ! Oloke Meji ! Ila (Oct.) ! Degema ! Cross River (Jan) ! Also in St. Thomas and Prince's Islands, Spanish Guinea and Uganda. Exsicc.—*Millen* 47. *Foster* 107. *Holl.* 235. *Vigne* 1180. *Talb.* 3676. *N. W. Thomas* 1939. (See Appendix).

7. **C. glomeruliferum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *C. obovatum* Engl. Monogr. Sapot. 43, not of G. Don. *Manilkara dahomeyensis* A. Chev. Bot. 394, not of Pierre. A tree with pale leaves grey-silky below, and small flowers clustered mostly below the leaves.
Sierra Leone : Mt. Gonkwi (Feb.) ! Dahomey : Zagnanado (Feb.) ! Savalou (May) ! Also in Uganda. Exsicc.—*Sc. Elliott* 4867. *Chev.* 23034 ; 23732 ; 23789.

8. **C. metallicum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A medium-sized tree, the leaves more or less silvery below, with flowers whitish, few in small axillary clusters.
Gold Coast : Banka, S. Ashanti (Sept.) ! Exsicc.—*Vigne* 1364. (See Appendix).

9. **C. giganteum** *A. Chev.* Bot. 386, name only. *C. obovatum* A. Chev. Vég. Ut. 5 : 237, not of G. Don. A tall tree with rather large leaves slightly tawny pubescent below like the branchlets. (R) Gold Coast : Offin R. (Feb.) ! Exsicc.—*Chipp* 115. *Chev.* 16180 ; 22512. (See Appendix).

10. **C. macrophyllum** *G. Don* in Trans. Hort. Soc. 5 : 458 . A tree with large leaves shining golden-pubescent below.
Sierra Leone Exsicc.—*G. Don.* (See Appendix).

11. **C. perpulchrum** *Mildbr.* MS.; Holl. 3 : 398 (as *Chrysophyllum sp.*). A tree up to 100 ft. high, with subcoriaceous leaves red-brown velvety below.
Gold Coast: Sefwi district (Mar.)! S. Nigeria: Benin! Western Prov.? locality? Also in Cameroons and Uganda. Exsicc.—*Vigne* 234; 1185. *Hitchens. Thomson & Sankey.* (See Appendix).

12. **C. africanum** *A.D.C.*—F.T.A. 3 : 500; Engl. Monogr. Sapot. 43, t. xv. A (excl. syn.); Holl. 3 : 397; Chev. Bot. 385. A medium-sized or large tree, the rather large leaves covered below with a very close light brown or chestnut-coloured tomentum.
Sierra Leone: Regent! Ivory Coast: Agboville (fr. Nov.)! Bouroukrou, Abé country; Upper Sassandra between Gouckangouiné and Drouplau. Gold Coast: Tano R. (fr. Sept.)! Agogo, Ashanti (fr. May) Lake Bosumtwi (fr. Dec.)! Bonsa R., Essuasu (fr. July)! Cameroons Mt., Likomba Plantation (fr. Nov.)! Bimbia Road! Fernando Po, Clarence Cove (fr. Nov.)! Extends to Gabon and Portuguese Congo, and in Uganda. Exsicc.—*Afzelius. T. Vogel* 116. *Daniell. Mann* 1154. *Chipp* 339; 444. *Vigne* 917; 1503. *Milbr.* 10609. *Maitland* 416. (See Appendix).

13. **C. Laurentii** *De Wild.* Miss E. Laurent 1 : 429, t. 133. *C. farannense* A. Chev. *C. Sapini* De Wild. A tree 80–100 ft. high with long subcoriaceous leaves crowded towards the end of the branches, the leaves shining above, minutely rusty-greyish, pubescent below.
French Guinea! Farana! Liberia: Duport! Ivory Coast: Cavally River, in swampy forest! S. Nigeria: Eket! Also in the Congo basin and Nyasaland. Exsicc.—*Chandler. Chev.* 13395. *Linder* 1479. *Talb.* (no number). (See Appendix).

14. **C. prunifolium** *Baker*—F.T.A., 3 : 499. A tree 30 ft. high, rusty-silky on the branchlets and under surface of the leaves.
Fernando Po (Mar.)! Exsicc.—*Mann* 2344.

*Excluded Species.*

*C. Akuasi* A. Chev. Bot. 385, name only, is **Uvaria anonoides** *Baker f.* (*Anonaceae*).

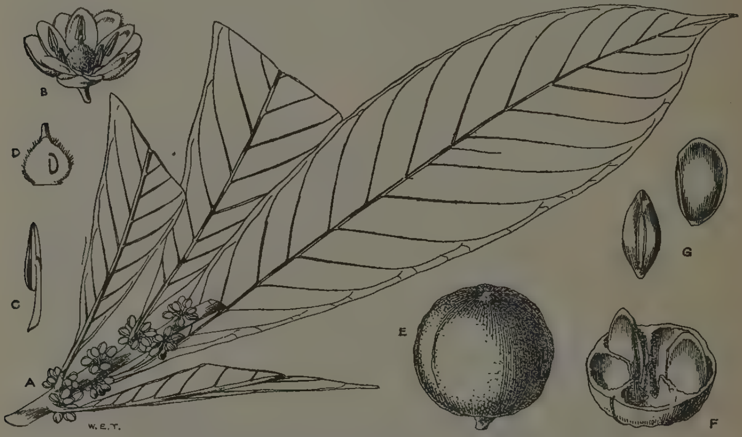

FIG. 180.—CHRYSOPHYLLUM ALBIDUM *G. Don* (SAPOTACEAE).

A, flowering shoot. B, open flower. C, Stamen. D, longitudinal section of ovary. E, fruit. F, interior of fruit with seed. G, Seeds.

### 3. **PACHYSTELA** Pierre ex Engl. Monogr. Afr. Pflanzenf. Sapotac. 35 (1904).

Leaves 15–25 cm. long, 6–9 cm. broad, narrowed to a broadish slightly cordate base, elongate-obovate, abruptly acuminate, covered with a thin felt of hairs below, with about 16 pairs of prominent lateral nerves; stipules subulate-filiform, 2–5 cm. long; flowers not seen .. .. .. .. .. .. .. .. 1. *argentea*

Leaves smaller, glabrous below, acute at the base:

Leaves narrowly acuminate, very narrowly cuneate at the base, obovate, up to 22 cm. long and 7 cm. broad, with about 10 pairs of lateral nerves; stipules persistent, subulate, up to 1·5 cm. long; flowers crowded along the shoots below the leaves, shortly pedicellate; calyx appressed-tomentose outside; fruits oblong-ellipsoid, beaked, 2–2·5 cm. long, glabrescent .. .. .. .. .. 2. *brevipes*

Leaves obtusely and broadly pointed, narrowed to the base, 8–13 cm. long, 2·5–4 cm. broad, with numerous very obscure lateral nerves; stipules deciduous; flowers clustered along the branchlets below the leaves, shortly pedicellate; calyx-lobes puberulous, 2·5 mm. long .. .. .. .. .. .. 3. *micrantha*

1. **Pachystela argentea** *A. Chev.* Bot. 391, name only. A tree.
Dahomey: Bokotu Reserve! Exsicc.—*Chev.* 22865.

2. **P. brevipes** *Baill.* in Bull. Soc. Linn. Paris 2 : 947; Engl. Monogr. Sapot. 37. *Sideroxylon brevipes* Baker—F.T.A. 3 : 502. *S. longistylum* Baker—F.T.A. 3 : 502. *Pachystela cinerea* Pierre ex Engl. l.c. 36, t. xii., incl. vars. *undulata, ogowensis, cuneata, batangensis* Engl. *P. Pobeguiniana* Pierre; Chev. Bot. 391. *P. albida* A. Chev. *P. liberica* Engl. *Bakerisideroxylon djalonense* A. Chev. *Bakeriella brevipes. B. Pobeguiniana* and *B. longistyla* Dubard. A fair-sized tree with small whitish flowers and yellow fruits.

French Sudan: Siguiri. Senegal! Casamance! French Guinea to Gold Coast: various localities (Aug., Sept., young fr. Jan.)! Dahomey: Porto Novo; between Savé and Agouagon. S. Nigeria: Lagos, Ikoyi (Jan.)! Oloke Meji! Abeokuta. Cameroons Mt., Buea (fr. June)! Extending to Angola and East Africa. Exsicc.—*Heudelot* 731. *Sc. Elliot* 4365; 4459b; 5132; 5456. *Linder* 644; 908; 935. *Carder. Millen* (no number). *Foster* 108. *Dalz.* 1273; 1385. *Maitland* 44. *Chev.* 13531; 16200; 20418. *Caille* (ex Herb. Chev.) 14904. *Dinklage* 2442. (See Appendix).

3. **P. micrantha** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Mimusops micrantha* A. Chev. Bot. 393. A large tree, more or less like the last but with smaller flowers and leaves.

Sierra Leone: Njala (May)! Ivory Coast: Aboisso (Apr.)! Lagune Potou (Feb.)! Sassandra basin, between Zaéblé and Boutoubré (May)! Gold Coast: Ashanti, Abofaw (June)! Exsicc.—*Chev.* 16226; 16307; 17979. *Deighton* 696. *Vigne* 1179. (See Appendix).

### 4. **SERSALISIA** R.Br.—Engl. Monogr. Afr. Pflanzenf. Sapotac. 29 (1904).

Branchlets rather stout, brownish tomentose; leaves oblanceolate to narrowly oblong-oblanceolate, shortly and obtusely pointed, narrowed from well above the middle to the base and there obtuse, 10–16 cm. long, 3–6 cm. broad, slightly undulate on the margin, villous only on the midrib below; lateral nerves 12–16 pairs; petiole 1 cm. long, stout, tomentose; flowers clustered, axillary, subsessile; sepals villous; fruit glabrescent, ellipsoid, about 1 cm. long, tipped by the short persistent slender style *Afzelii*

**S. Afzelii** *Engl.* l.c. 30, t. 10, fig. B; Chev. Bot. 388. *S. microphylla* A. Chev. Bot. 388. A tree 15–20 ft. high, with white flowers.

French Guinea: Kollangui and neighbourhood (Mar.)! Timbo to the Santa (Mar.)! Futa-Jallon, Diaguissa Plateau (Mar.)! Ymbo to Orobe (Nov.)! Soukourala (Jan.)! Sierra Leone! Dahomey: Djougou to Pobégou, 1,500 ft. (June). Atacora Mts., 1,200–2,000 ft.! Exsicc.—*Chev.* 12218, etc.

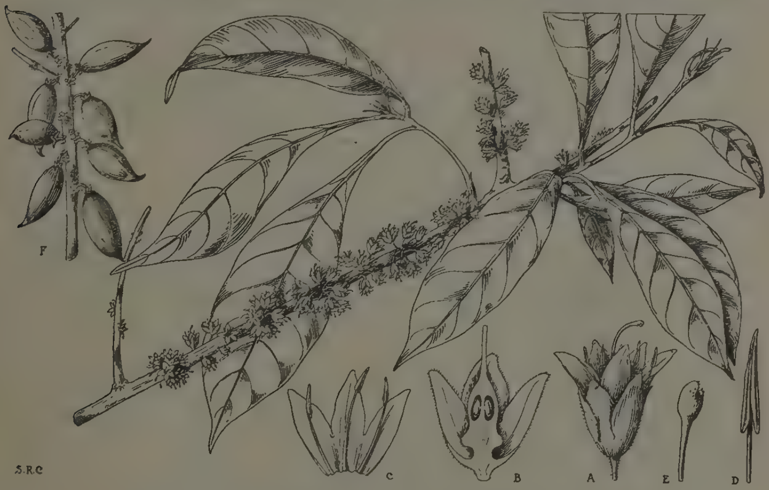

FIG. 181.—PACHYSTELA BREVIPES *Baill.* (SAPOTACEAE).

A, flower. B, longitudinal section of flower. C, part of corolla laid open. D, stamen. E, stigma. F, fruits.

### 5. **DELPYDORA** Pierre in Bull. Soc. Linn. Par. 1897: 1275; Engl. l.c. 49.

Branchlets hispid-pilose; leaves narrowly obovate, long- and acutely acuminate, slightly unequal-sided at the base, up to 30 cm. long and 9 cm. broad, pilose on the midrib below; lateral nerves 18–20 pairs; flowers in axillary fascicles; pedicels 3 mm. long, pilose; sepals about 6 mm. long, thinly strigose-pilose; petals about as long .. .. .. .. .. .. .. .. .. .. *gracilis*

**D. gracilis** *A. Chev.* Bot. 394, name only. A shrub or tree.

Ivory Coast: Cavally Basin, Tépo country, between Toula and Nekaougnié (July)! Grabo, basaltic hills of Mt. Tou (July)! Exsicc.—*Chev.* 19583; 19672.

### 6. **SIDEROXYLON** Linn.—F.T.A. 3: 501; Engl. Monogr. Afr. Pflanzenf. Sapotac. 25 (1904).

Leaves acuminate, acute at the base, 10–15 cm. long, 4–6 cm. broad, glabrous, with about 10 pairs of very indistinct lateral nerves; petiole 1·5–2 cm. long; flowers in dense fascicles at the distant nodes, numerous; pedicels 1–1·5 cm. long; calyx-segments ovate, obtuse, 4–5 mm. long; corolla-lobes membranous, ovate-acuminate, a little longer than the calyx ; fruit not seen ; seeds narrowly and obliquely lanceolate, brown, shining, 3 cm. long, with the scar reaching nearly the full length 1. *Aylmeri*

Leaves not acuminate, elliptic, rounded at the base, 5–10 cm. long, 4–6 cm. broad, glabrous, with 12–15 pairs of lateral nerves distinct below ; petiole 1 cm. long ; flowers few, axillary ; pedicels tomentellous, about 5 mm. long ; calyx softly pubescent outside ; fruit obovoid-globose ; seeds ovoid, 1·3 cm. long, with a broad elliptic scar nearly as long .. .. .. .. .. .. .. 2. *altissimum*

1. **Sideroxylon Aylmeri** *Scott* in Kew Bull. 1915 : 45. *Mimusops clitandrifolium* A. Chev. A large forest tree with buttressed stem, glabrous, with white latex and clustered white flowers scarcely ¼ in. long.
   Sierra Leone : Falaba (Apr.) ! Gumati (May) ! Liberia : Dukwia R. (Mar.) ! Ivory Coast : Malamalasso on Lower Comoé (Mar.) ! Cavally Basin, Grabo, on basaltic hills of Mt. Copé (July) ! Exsicc.—*Aylmer* 57. *Lane-Poole* 235. *G. P. Cooper* 311. *Chev.* 16247 ; 19699. (See Appendix).
2. **S. altissimum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Hormogyne altissima* A. Chev. Bot. 392. A large forest tree, with markedly nerved leaves, and whitish flowers in short axillary clusters.
   French Guinea : Kaba Valley and district (May) ! Faranna (May) ! Mamou to Kindia (May) ! Kissi, Koundian (Feb.) ! Iles de Los ! Gold Coast : Abetifi (Mar.) ! Also in Upper Nile Land. Exsicc.—*Johnson* 624. *Brent* 543. *Chev.* 13129 ; 13141 ; 13404 ; 13583 ; 20749. (See Appendix).

### 7. **BAKERISIDEROXYLON** Engl. Monogr. Afr. Pflanzenf. Sapotac. 33 (1904).

Leaves very narrowly oblong-oblanceolate, gradually pointed, about 15 cm. long and 4·5 cm. broad, glabrous, with about 14–15 pairs of lateral nerves ; stipules subpersistent, subulate-linear, about 1 cm. long ; flowers numerous, fasciculate on the two-seasons' old wood ; pedicels slender, 1 cm. long ; sepals narrowly lanceolate, 1·5 mm. long, puberulous ; petals a little longer than the sepals .. .. .. *revolutum*

**B. revolutum** Engl. l.c. 34, t. 11, fig. B ; Chev. Bot. 390. *Sideroxylon revolutum* Baker—F.T.A. 3 : 503. *Vincentella revoluta* Pierre. A tree 30–60 ft. high, with fascicles of small white flowers.
Ivory Coast : Byanouan (Mar.) ! Moyen-Cavally, between Fort Binger and Mt. Niénokoué (July) ! Cameroons Mt., Buea, 3,000 ft. (Jan.) ! Fernando Po : 2,000 ft. (Dec.) ! Also in French Cameroons. Exsicc. —*Mann* 635. *Chev.* 17809 ; 19515. *Maitland* 250.

### 8. **SYNSEPALUM** A.DC.—Engl. Monogr. Afr. Pflanzenf. Sapotac. 32 (1904).

Leaves glabrous below, obovate-oblanceolate, rounded or shortly acuminate at the apex, markedly attenuated to the base, 5–10 cm. long, 2–4 cm. broad, with about 8 pairs of lateral nerves ; petiole short ; flowers axillary, subsessile ; calyx ribbed, 5 mm. long, tomentellous outside, lobes short, triangular ; corolla with a narrow tube as long as the calyx, lobes exserted, glabrous ; style exserted ; fruit ellipsoid, 1-seeded, 2 cm. long, nearly glabrous ; seeds nearly as large as the fruit .. 1. *dulcificum*

Leaves closely silky below, elliptic-oblanceolate, acuminate, up to 15 cm. long and 5 cm. broad, with 10–12 pairs of lateral nerves ; petiole 1·5 cm. long ; flowers axillary, clustered ; buds finely appressed-pubescent ; fruits subsessile, broadly ellipsoid, beaked, about 2·5 cm. long, puberulous .. .. .. .. 2. *glycyodorum*

1. **S. dulcificum** *Daniell* in Pharm. Journ. 11 : 445 ; Engl. l.c. 32 ; Chev. Bot. 390. *Sideroxylon dulcificum* A.DC.—F.T.A. 3 : 503. A shrub or small tree often cultivated—the " Miraculous Berry."
   Gold Coast : Aburi ! Kibbi (fr. Jan.) ! commonly planted ; Essuasu, Bonsa River (probably wild, May) ! Dahomey : Zagnanado (Feb.) ! Abomey. S. Nigeria : Lagos ! Agege ! Victoria (Feb.) ! Also in Cameroons and Congo area. Exsicc.—*Moloney*. *Johnson* 147. *Foster* 221. (See Appendix).
2. **S. glycyodorum** *Wernham* in Journ. Bot. 1917 : 82. A shrub or small tree.
   S. Nigeria : Degema ! Exsicc.—*Talb.* 3720. (See Appendix).

### 9. **MALACANTHA** Pierre Notes Bot. 1891 : 60 ; Engl. Monogr. Afr. Pflanzenf. Sapotac. 47 (1904).

Leaves permanently tomentose below, more or less abruptly rounded at the base, obovate-elliptic, subacuminate, 8–15 cm. long, 5–8 cm. broad, with 15–20 pairs of lateral nerves prominent below ; flowers in dense sessile axillary clusters, rusty-tomentose all over ; fruits ellipsoid, apiculate, about 2 cm. long 1. *Heudelotiana*

Leaves becoming nearly glabrous below, usually cuneate at the base, obovate, up to 23 cm. long, 6–12 cm. broad, with numerous pairs of very prominent lateral nerves ; flowers sessile, clustered ; calyx tomentose outside, lobes elliptic ; corolla-tube 4 mm. long, lobes 3 mm. long, glabrous ; ovary tomentose ; fruit ellipsoid, about 2·5 cm. long, pubescent .. .. .. .. .. .. 2. *alnifolia*

1. **M. Heudelotiana** *Pierre* Notes Bot. 60 ; Engl. l.c. 48 ; Chev. Bot. 387. *M. robusta* A. Chev. Bot. 387. A large forest tree with straight bole, flowering before the leaves.
   Senegal : Casamance, Sinedone ! Sierra Leone : Heddle's Farm ! Ivory Coast : Bouroukrou ! Diambarakrou in Indénié ! Morenou ! Gold Coast : Adiambra (fr. May) ! S. Ashanti, Prah R. (Mar.) ! Kwahu Prahsu (Feb.) ! S. Nigeria : Ibadan Forest Reserve (Apr.) ! Exsicc.—*Lane-Poole* 374. *Vigne* 863 ; 1054 ; 1614 ; 1828. *Punch* 120. *Chev.* 16134. (See Appendix).
2. **M. alnifolia** *Pierre* l.c. 61 ; Engl. l.c. 49. *Chrysophyllum ? alnifolium* Baker—F.T.A. 3 : 499. *Malacantha Warneckeana* Engl. ; Chev. Bot. 387. *M. obtusa* C. H. Wright. *M. acutifolia* A. Chev. A shrub or sometimes a fair-sized tree with rather broad coarsely nerved leaves.
   French Guinea : Leprince Rd. ! Ivory Coast : Anoumaba (Nov.) ! Gold Coast : Shai Plains (Jan.) ! Cape Coast (Mar.) ! Accra Plains (Feb.) ! Abofuo (Feb.) ! N. Terr., Bana Hill ! Kulpawn R. ! Togo : Lome ! Dahomey : Pobé to Adjouare ; Savé ; Savalou hill. N. Nigeria : Lokoja, Patti hill (Apr.) ! Yola, on rocky hills (Mar.) ! S. Nigeria : Lagos Colony ! Onitsha ! Exsicc.—*Barter* 1788. *Rowland*. *Foster* 37. *Johnson* 529. *Elliott* 51. *Chev.* 12810 ; 22397 ; 23700. *Vigne* 1807. *Warnecke* 413. *Kersting* A 236. *Mildbr.* 7514. (See Appendix).

### 10. **OMPHALOCARPUM** P. de Beauv.—F.T.A. 1 : 171.

Flowers borne on the slender branches below the leaves, few in each cluster; pedicels 5 mm. long, appressed-tomentose; calyx tomentose, lobes ovate, 8 mm. long; leaves oblong-oblanceolate, obtusely acuminate, 12–20 cm. long, 4–8 cm. broad, glabrous, with about 8–10 pairs of lateral nerves; petiole up to 4 cm. long 1. *pachysteloides*
Flowers borne on the main trunk:
Flowers pedicellate, pedicels not bracteate except at the base:
Leaves elongate-obovate, long-attenuated to the base, rounded at the apex, about 40 cm. long and up to 18 cm. broad, with numerous (over 20) pairs of prominent lateral nerves, glabrous; flowers several in each cluster; pedicels up to 1 cm. long, tomentose; sepals ovate, 1–1·5 cm. long, tomentose; corolla 3 cm. long, the lobes slightly pubescent on the margin; fruits depressed-globose, about 14 cm. diam., the outer shell about 1·5 cm. thick, openly reticulate in section; seeds nearly flat, 4 cm. long, 2·5 cm. broad, with a narrow scar up one side 2. *ahia*
Leaves obovate or oblanceolate, rounded or obtusely acuminate at the apex, attenuated to the base, 12–25 cm. long, 4–8 cm. broad, glabrous, with about 10 pairs of lateral nerves; flowers more or less as above but calyx and pedicels soon glabrescent; fruits (according to sketch) depressed-globose .. .. 3. *elatum*
Flowers subsessile, with several imbricate bracts below the calyx; leaves oblanceolate, not acuminate, much narrowed to the base, 8–13 cm. long, 3–5 cm. broad, glabrous, with 6–7 pairs of lateral nerves; bracts very broadly ovate, tomentose outside, about 8 mm. long; young fruits depressed-globose, glabrous, with a persistent style; mature fruit depressed-globose, about 15 cm. diam.; seeds as in *O. ahia* .. .. .. .. .. .. .. .. .. 4. *procerum*

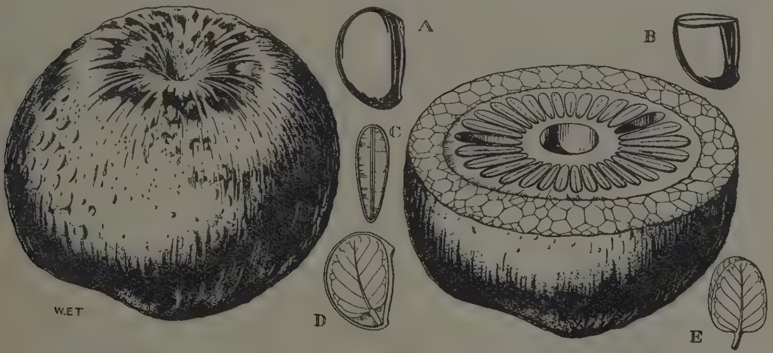

FIG. 182.—FRUITS OF OMPHALOCARPUM AHIA *A. Chev.* (SAPOTACEAE).

A, seed. B, part of seed. C, cross-section of seed. D, seed opened showing one cotyledon and radicle. E, embryo.

1. **Omphalocarpum pachysteloides** *Mildbr.*, MS. A tree with white flowers few in clusters below the leaves.
   Sierra Leone: Kabusa (Apr.)! Also in Cameroons. Exsicc.—*Sc. Elliot* 5471.
2. **O. ahia** *A. Chev.* Vég. Util. 5 : 244; Chev. Bot. 389. A tall tree with clear bole and large leaves, conspicuous by the clustered fruits on the main stem.
   Sierra Leone: Mokeira, Rokelle R.! Ivory Coast: Songan dans l'Indénié (Mar.)! Yapo (Oct.)! Gold Coast: Tarkwa (fl. & fr. June)! Agogo (Apr.)! Exsicc.—*Smythe* 242. *Chipp* 242. *Vigne* 1121. *Irvine* 936. (See Appendix).
3. **O. elatum** *Miers* in Trans. Linn. Soc. Ser. 2, 1 : 16; Holl. 3 : 408. *O. Radlkoferi* Pierre—Engl. Monogr. Afr. Pflanzenf. Sapotac. 16, t. iv.–v., incl. var. *pluriloculare* Engl. *O. procerum* Oliv. F.T.A. 1 : 171, partly, not of P. de Beauv.; Chev. Bot. 390. *O. Talbotii* Wernham (at least as to flowers). *O. anocentrum* A. Chev. Bot. 390, not of Pierre. A large tree with white waxy flowers and fruits clustered on the lower part of the stem.
   Sierra Leone: Bagroo R.! Guma, Colonial Reserve! Liberia: Dukwia R. (Apr.)! Ivory Coast: Accrédiou (Feb.)! Yapo (Oct.)! Gold Coast: Ankwantambra (Nov.)! Prestea (July)! S. Nigeria: Calabar! Oban! Eket! Degema! Cameroons Mt., Victoria; Soppo near Buea; Cameroons R. (Jan.)! Also in S. Cameroons. Exsicc.—*Mann* 712; 815. *Thomson* 128. *King-Church* 2. *McAinsh* 390. *Vigne* 1265. *Talb.* 361; 492 bis; 3142. *G. P. Cooper* 81; 383. *Chev.* 16194; 22311. (See Appendix).
4. **O. procerum** *P. de Beauv.* Fl. Owar. 1 : 7, t. 5, 6; F.T.A. 1 : 171, partly; Holl. 3 : 408; Engl. l.c. 14, t. iii., B. A tall tree resembling the last; flowers white.
   Gold Coast: Agogo (Apr.)! Fomang Su (Feb.)! S. Nigeria: Warri district; Eket! Exsicc.—*Vigne* 1120; 1822. *Talb.* 3748.

### 11. **MIMUSOPS** Linn. (emend.).—F.T.A. 3 : 505, partly.

Leaves large, 20–40 cm. long and 7–12 cm. broad, elongate-obovate, abruptly acuminate, with very numerous prominent lateral nerves, rusty-pilose below at length nearly glabrous; petiole 3–5 cm. long, at first densely villous; flowers clustered amongst the leaves; pedicels up to 4 cm. long; calyx-lobes ovate, acuminate, tomentose outside; corolla-lobes very small; staminodes spoon-shaped; ovary 8-celled; fruits subglobose, 6 cm. diam. or more; seeds obliquely ellipsoid, about 6–7 cm. long, ⅔ hard and shining, the other third rough .. .. .. .. .. 1. *djave*

Leaves much smaller than in above and with fewer less prominent lateral nerves:

Outer calyx-lobes glabrous, broadly triangular, 5 mm. long, the inner ones softly tomentellous; leaves obovate or narrowly obovate-elliptic, 7–15 cm. long, 3–6 cm. broad, with numerous faint lateral nerves, glabrous; petiole slender, up to 4 cm. long; pedicels 2 cm. long, glabrous; corolla-tube very short, glabrous, lobes ovate, 3 mm. long; staminodes ovate-lanceolate; fruits not seen; seeds as in *M. djave* but the scar occupying nearly half of the surface .. .. 2. *Heckelii*

Outer calyx-lobes pubescent or tomentose:

Leaves tomentose below especially on or near the midrib, elliptic or slightly obovate, obtusely acuminate, 8–15 cm. long, 4–7 cm. broad, with numerous fine lateral nerves; petiole thinly tomentose, 2 cm. long; flowers few in the leaf-axils; pedicels 2–4 cm. long, tomentose; calyx-lobes narrowly lanceolate, 1–1·5 cm. long; ovary 8-celled; fruit ellipsoid, mucronate, 2 cm. long; seeds with a basal scar, 1·8 cm. long .. .. .. .. .. .. .. .. .. .. 3. *fragrans*

Leaves glabrous below, elliptic, very shortly acuminate, 7–10 cm. long, 3–5 cm. broad, with numerous pairs of very fine lateral nerves; petiole about 1·5 cm. long; flowers axillary, few; pedicels 5–6 mm. long, shortly tomentose; calyx tomentose, 5–6 mm. long .. .. .. .. .. .. 4. *Warneckei*

**Mimusops Elengi** *Linn.* (*M. djurensis* Engl.—Chev. Bot. 393). A native of the Eastern tropics, cultivated as a shade-tree.

1. **Mimusops djave** *Engl.* Nat. Pflanzenf. Nachtr. 279; Engl. Monogr. Afr. Pflanzenf. Sapotac. 81, tt. 32 and 33. *Baillonella Djave* Pierre. *B. toxisperma* Pierre. *Bassia Djave* Lanessan. *B. toxisperma* Raoul. A very large forest tree with large prominently nerved leaves and rather long-stalked flowers crowded at the ends of stout branchlets.

S. Nigeria: Degema! Johann-Albrechtshöhe! Extends to Gabon and Portuguese Congo. Exsicc.—*Sherriff*. *Staudt* 899. *Talb.* 3781. (See Appendix).

2. **M. Heckelii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Dumoria Heckelii* A. Chev. *Tieghemella Heckelii* Pierre. A very large forest tree.

Sierra Leone: ? locality! Liberia. Ivory Coast: several localities! Gold Coast: Prestea! Kwahu Prasu! Ahinkoro, N. Ashanti! Assuantsi! Exsicc.—*D. G. Thomas* T 36. *Green* 897. *Vigne* 1596. *Imp. Inst.* 38765; 40125. *Chev.* 16253; 22304. (See Appendix).

3. **M. fragrans** *Engl.* l.c. 4, 2: 151, fig. 82, N–S; Engl. Monogr. l.c. 77, t. 31 A. *M. longipes* and *M. Kerstingii* Engl. *Imbricaria fragrans* Baker—F.T.A. 3: 509. A rather small tree with rusty-tomentose, long-stalked white flowers 2–4 together in the axils of the upper leaves.

Gold Coast: Ejura (May)! Togo: Sokode (Apr.)! N. Nigeria: Little Koriga R. (Feb.)! S. Nigeria: Yoruba! Lagos Colony! Exsicc.—*Barter* 1217. *Vigne* 1165. *Rowland.* *Kersting* 46.

4. **M. Warneckei** *Engl.* Monogr. Afr. Pflanzenf. Sapotac. 68.

Togo: Lome! Exsicc.—*Warnecke* 311; 326.

## 12. **MANILKARA** Rheede—Dubard in Ann. Mus. Col. Marseille Sér. 3, 3: 6 (1915).

Leaves oblong or narrowly oblong-obovate, rounded or shortly acuminate, usually shortly narrowed at the base, 7–14 cm. long, 4–6 cm. broad, greyish, finely silky below when young, with numerous pairs of faint lateral nerves; petiole up to 3 cm, long; flowers densely clustered amongst the leaves; pedicels about 1 cm. long. puberulous; calyx lobed to the base, lobes oblong-elliptic, 3–4 mm. long, shortly tomentellous outside; corolla-lobes glabrous; fruits subglobose, about 2·5 cm. diam., several-seeded; seeds 1 cm. long, shining .. .. .. 1. *multinervis*

Leaves broadly obovate or obovate-elliptic, rounded or slightly acuminate, 6–16 cm. long, 4–8 cm. broad, silky below when young, often glaucous-grey when older, with numerous pairs of obscure lateral nerves; petiole up to 3 cm. long; flowers clustered with the leaves; pedicels 1–1·5 cm. long, nearly glabrous; calyx-lobes ovate-triangular, 5 mm. long, finely puberulous; fruits obovoid, 3 cm. long, finely puberulous 2. *lacera*

1. **M. multinervis** *Dubard* in Ann. Mus. Col. Marseille Sér. 3, 3: 24. *Mimusops multinervis* Baker—F.T.A. 3: 506; Engl. Monogr. Sapot. 57. *M. densiflora* Baker. *M. djalonensis* and *M. atacorensis* A. Chev. Bot. 392–3. *M. Chevalieri* Pierre; Chev. Bot. 392. *M. Kerstingii* Engl. Monogr. Sapot. 78. A fairly large tree, the leaves without stipules more or less crowded towards the end of the branchlets, with clustered white or brownish flowers amongst them.

French Sudan: Sangarala (Feb.)! Siguiri! Kouroussa! French Guinea: Kollangui (Mar.)! Futa Jallon, Labé! Sierra Leone: Petifu, Tabainku River! Northern Prov.! Liberia: Gbanga! Ivory Coast: Mankono! Gold Coast: Prang (Jan.)! Pong (Mar.)! Bantela (Apr.)! Yeji (Mar.–Apr.)! River Tafo (fr. Apr.)! Togo: Sokode-Basari (Dec., fr. Oct.)! Kete Kratschi; Loso in gallery forest. Dahomey; Atacora Mts., various localities, 1,200–1,850 ft.! N. Nigeria: Nupe! Bauchi Plateau, Naraguta (Dec.)! S. Nigeria, Lagos Colony, Mt. Ado! without locality! Exsicc.—*Barter* 1123. *Millen* 65. *Rowland.* *Foster* 11; 17. *Lely* 733. *Dawe* 501; 506. *Kitson* 662; 842; 1048. *Vigne* 1552. *Linder* 796. *Chev.* 344; 2832; 12191; 12342; 12830; 21897; 24178; 24192; 24316. *Kersting* A. 229. (See Appendix).

2. **M. lacera** *Dubard* l.c. *Mimusops lacera* Baker.—F.T.A. 3: 507; Chev. Bot. 393; Engl. l.c. 59, t. 20, B, a–i (incl. vars. *longipetiolata* and *Newtonii* Engl. l.c.). *M. sublacera* Chev. Bot. 393. A tree up to 40–50 ft., or a shrub in the open.

Sierra Leone! Ivory Coast: several localities by rivers and lagoons or on rocks (Mar.)! Liberia! Gold Coast: Ejura! Mampong, Ashanti (May)! Togo: Lome! Bagida (fl. and fr. Apr.)! Dahomey: Porto Novo (Mar.)! Kotonu! N. Nigeria: Nupe! S. Nigeria: Nun R. (Sept.)! Also in Cameroons and Gabon. Exsicc.—*Afzelius.* *Barter* 1270. *Mann* 489. *Chipp* 759. *Vigne* 1184. *Ainslie* 404. *Linder* 53. *Chev.* 4483; 16254; 19107; 19186; 19451; 23347; 23424. *Warnecke* 106; 385. (See Appendix).

## 117. MYRSINACEAE

With M. B. Moss.

Trees, shrubs or rarely subherbaceous. Leaves alternate, rarely subopposite, simple, punctate or with schizogenous lines. Flowers small, usually hermaphrodite, in clusters, racemes or panicles. Sepals free or connate, often gland-dotted, valvate, imbricate or contorted, persistent. Corolla gamopetalous or rarely petals free; lobes contorted, imbricate or valvate. Stamens the same number as and opposite the petals, the filaments more or less adnate to the corolla; anthers introrse, opening by slits or apical pores. Ovary superior to half-inferior, 1-celled; style simple; ovules numerous, on a free central placenta. Fruit a berry or drupe, rarely irregularly dehiscent. Seeds with smooth or rarely ruminate endosperm, with the embryo sometimes placed transversely.

Mainly in the tropics. The woody habit and the stamens the same number as and opposite to the petals are characteristic; leaves usually gland-dotted.

Calyx free from the ovary:

Flowers in axillary fascicles or below the leaves; petals united at the base into a short tube:

Trees .. .. .. .. .. .. .. .. .. 1. **Rapanea**

Herbs or small shrubs .. .. .. .. .. .. 2. **Afrardisia**

Flowers racemose; petals free .. .. .. .. .. .. 3. **Embelia**

Calyx-tube adnate to the ovary; petals united into a short tube .. .. 4. **Maesa**

### 1. RAPANEA Aubl. Hist. Pl. Guian. Franç. 1 : 121, t. 46 (1775).

(*Myrsine* Baker—F.T.A. 3 : 493, not of Linn.)

Leaves obovate-oblanceolate, obtuse at the apex, gradually cuneate at the base, 8–12 cm. long, 3–4·5 cm. broad, glabrous, with numerous conspicuous lateral nerves; flowers in axillary clusters or below the leaves; calyx 2 mm. long, lobes small and rounded, minutely ciliate; corolla-tube very short, lobes oblong, 3 mm. long, with black longitudinal markings; fruits globose, up to 5 mm. diam., tipped by the short persistent style, longitudinally striate .. .. .. .. .. .. *neurophylla*

**R. neurophylla** *Mez* in Engl. Pflanzenr. 4, 236 : 374. *Myrsine melanophlaeos* Baker—F.T.A. 3 : 494, not of R. Br. *M. neurophylla* Gilg. A tree 30–50 ft. high; branchlets purplish, glabrous; flowers very small, clustered below the leaves.

Cameroons Mt., forest, 4,000–7,000 ft. (Dec.–Jan.)! Also in E. Africa. Exsicc.—*Mann* 1200; 2175. *Preuss* 917. *Lehmbach* 22.

### 2. AFRARDISIA[1] Mez in Engl. Pflanzenr. 4, 236, Myrsinac. 183 (1902).

Flowers numerous (about 12–14) in each axillary fascicle; flower-buds ovoid, shortly acute; leaves oblong-elliptic, shortly and broadly acuminate, broadly cuneate at the base, about 12 cm. long and 5 cm. broad, punctate below; lateral nerves 7–9 pairs; petiole 1–1·5 cm. long; pedicels 8 mm. long; petals acute, 4–5 mm. long 1. *oligantha*

Flowers 3–6 in each fascicle; flower-buds very narrow and acute, the petals spirally twisted; leaves obovate-elliptic, shortly acuminate, broadly cuneate at the base, about 12 cm. long and 5 cm. broad, very minutely punctate below, strongly reticulate above; pedicels 3–4 mm. long .. .. .. .. .. 2. *Schlechteri*

1. **A. oligantha** *Gilg & Schellenb.* MS.
   Cameroons Mt.! Exsicc.—*Weberbauer* 48.
2. **A. Schlechteri** *Mez* in Engl. Pflanzenr. 4, 236 : 185. *Ardisia Schlechteri* Gilg. A small shrublet about 1 ft. high.
   S. Nigeria: Bibundi (Apr.)! Exsicc.—*Schlechter* 12417.

### 3. EMBELIA Burm.—F.T.A. 3 : 496.

Leaves without visible black dots, obovate-oblong to obovate-elliptic, obtuse or very shortly apiculate at the apex, cuneate at the base, 6–13 cm. long, 3·5–6 cm. broad, thin and membranous; flowers 4 mm. diam., in loose short axillary racemes; pedicels 4–6 mm. long; styles persistent in fruit .. .. .. .. 1. *Rowlandii*

Leaves clothed with conspicuous black glands, obovate-oblong to obovate-elliptic, rounded at the apex; pedicels at most 3 mm. long:

Leaves glabrous below but with copious dots and linear glands, membranous, 6–8 cm. long, 2·5–4 cm. broad; lateral nerves not conspicuous; petiole 7–9 mm. long; flowers in dense axillary racemes up to 3 cm. long; bracts 1 mm. long; fruits globose, 4 mm. diam., densely black-dotted .. .. .. .. 2. *guineensis*

Leaves with a woolly midrib beneath, obovate-elliptic, 8–9 cm. long, 4–5 cm. broad; lateral nerves numerous and raised on both surfaces; petiole 1 cm. long; fruits globose, 6 mm. diam., with very close black glandular longitudinal markings; racemes about 4 cm. long; pedicels 2 mm. long; fruits globose, about 7 mm. diam., densely black-dotted .. .. .. .. .. .. 3. *djalonensis*

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[1] *A. cymosa* Mez (*Ardisia cymosa* Baker) is erroneously cited as being from Fernando Po; it is only known from St. Thomas' Island.

1. **Embelia Rowlandii** *Gilg* in Engl. Bot. Jahrb. 30 : 95. *E. dahomensis* A. Chev. Bot. 385, name only. Older branchlets covered with grey bark; lateral branchlets finely puberulous; racemes longer than the petiole.
Dahomey: Cercle de Djougou, between Bassila and Penesoulou (May)! Lagos Colony! Exsicc.—*Rowland. Chev.* 23825.

2. **E. guineensis** *Baker.*—F.T.A. 3 : 496; Chev. Bot. 385. *E. Gilgii* Mez. A climbing shrub with short almost catkin-like usually crowded racemes of white flowers on the older parts of the branchlets.
French Guinea: Futa-Jallon, on the banks of the Mafin at Dalaba (Apr.)! Sierra Leone: Bagroo River (Apr.)! Near Berria, Falaba (Mar.)! Gbanbama (Mar.)! Ivory Coast: upper valley of the Nuon, between Ganhoué and Bampleu (Apr.)! Dahomey: village of Tohoué, near Porto-Novo (Jan.)! Exsicc.—*Mann* 861. *Sc. Elliot* 5229. *N. W. Thomas* 9111.

3. **E. djalonensis** *A. Chev.* Bot. 384, name only. *E. guineensis* Mez in Engl. Pflanzenr. 4, 236 : 331, not of Bak. A climber in woods, the leaves with pubescent midrib and numerous lateral nerves.
French Guinea: Kollangui (Mar.)! Dantilia (Niger) (Mar.)! Exsicc.—*Chev.* 13537. *Sc. Elliot* 5266.

## 4. MAESA Forsk.—F.T.A. 3 : 491.

Leaves entire, rounded to subcordate at the base, broadly ovato-orbicular, up to 15 cm. long and 12 cm. broad, glabrous; lateral nerves about 7 pairs; inflorescence a loose axillary panicle up to 25 cm. long, minutely hairy; bracts subulate 1. *kamerunensis*

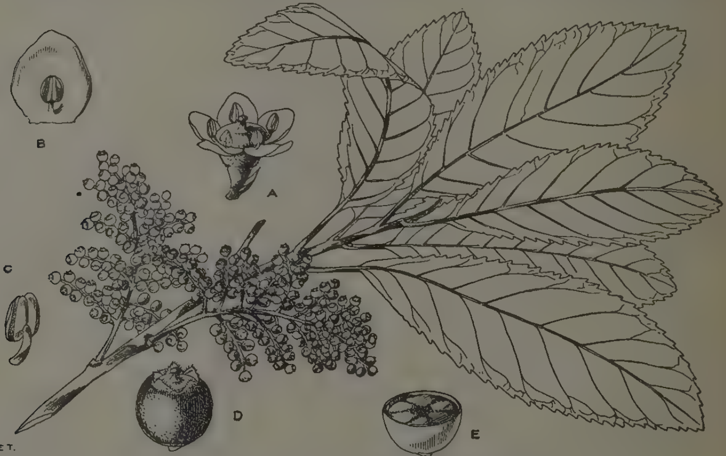

FIG. 183.—MAESA LANCEOLATA *Forsk.* (MYRSINACEAE).

A, flower. B, corolla-lobe and stamen from within. C, stamen. D, fruit. E, cross-section of fruit.

Leaves crenate or serrate, usually cuneate at the base:
- Leaves obovate, entire in the lower third, broadly cuneate from near the middle, shortly acuminate, 10–12 cm. long and 5–7 cm. broad; inflorescence few-flowered and little-branched, slender, 10 cm. or more long; flowers distinctly pedunculate 2. *nuda*
- Leaves ovate-elliptic to lanceolate-elliptic, rounded or at most shortly cuneate at the base, about 8–14 cm. long and 3–7 cm. broad; panicles $\frac{3}{4}$ as long as the leaves or less, sometimes paired in each axil, pubescent or puberulous; flowers numerous; calyx ciliate .. .. .. .. .. .. .. .. 3. *lanceolata*

1. **Maesa kamerunensis** *Mez* in Engl. Pflanzenr. 4, 236 : 27. *Maesa cordifolia* Baker—F.T.A. 3 : 492, not of Miq. A climbing shrub, 15–20 ft., with large widely subcordate leaves and slender panicles of small flowers.
Cameroons Mt., forest, 2,500 ft. (Dec.)! Also in French Cameroons. Exsicc.—*Mann* 1198.

2. **M. nuda** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Apparently a climbing shrub; leaves smooth; inflorescence slender, little-branched.
French Guinea: no precise locality! Exsicc.—*Farmar* 327.

3. **M. lanceolata** *Forsk.*—F.T.A. 3 : 492; Chev. Bot. 384. *M. djalonis* A. Chev., name only. A shrub 9–10 ft. high with yellowish white flowers.
French Guinea: Longuery (Dec.)! Futa-Jallon, Diaguissa, Dalaba and Boulivel (Sept.)! Labé (Mar.)! Ditinn (Apr.)! Diaguissa to Timbo (Apr.)! Ivory Coast: Upper Cavally, on the summit of Mount Gbon, 3,000–3,500 ft. (May)! Mount Do, near Gouékangouiné (May)! Upper Sassandra, at the foot of Mount Dou, and in the neighbourhood of Gouékouma village (May)! Cameroons Mt., forest, from Buea to the upper forest edge, 3,000–7,000 ft. (Dec.)! Fernando Po, 5,000 ft.! Widely spread in tropical Africa, Arabia and Madagascar and in S. Africa. Exsicc.—*Mann* 578; 1208; 2176. *Dunlap* 134; 149; 192. *Maitland* 252. *Chev.* 14831; 18611; 18678; 21410; 21432; 21479; 21671.

## 118. STYRACACEAE

Trees and shrubs, often with stellate or lepidote indumentum. Leaves alternate, stipules absent. Flowers actinomorphic, hermaphrodite, racemose, axillary or terminal. Calyx tubular, more or less adnate to the ovary; lobes or teeth valvate or open. Corolla gamopetalous or rarely of free petals, lobes 4–7, valvate or imbricate. Stamens equal and alternate with or double the number of the corolla-lobes, adnate to the corolla-tube or rarely free; anthers 2-celled, opening lengthwise. Ovary superior to inferior, 1–5-celled; style slender, 3–5-lobed; ovules 1 to many in each cell, axile, anatropous. Fruit drupaceous or capsular, calyx persistent. Seed with copious endosperm and straight or slightly curved embryo.

### 1. **AFROSTYRAX** Perk. and Gilg in Engl. Bot. Jahrb. 43 : 214, fig. 1.

Small trees; leaves alternate, long-acuminate. Flowers axillary, small. Calyx closed in bud. Petals 5, free. Stamens 10; anthers 4-celled. Ovary 1-celled, superior. Fruit dry, indehiscent.

Branchlets terete, shortly tomentellous; leaves elliptic, very long-caudate-acuminate, rounded at the base, 10–16 cm. long, 5–6 cm. broad, glabrous, entire; lateral nerves about 6 pairs, with very fine venation between; petiole 6–10 mm. long, turgid, minutely tomentellous; flowers axillary, small, paired, pedicels about 8 mm. long; calyx closed in bud, splitting into 2–3 segments, stellate-pubescent outside; petals 5, free, about 2 mm. long .. .. .. .. .. .. *kamerunensis*

**A. kamerunensis** *Perk. & Gilg* l.c. A small tree.
Cameroons Mt., Likomba, 150–300 ft., in the rain forest (Nov.)! Also in French Cameroons. Exsicc.—*Mildbr.* 10888.

## 119. LOGANIACEAE

### With M. B. Moss.

Mostly trees and shrubs; stem usually woody. Leaves opposite, simple; stipules present or absent. Flowers hermaphrodite, actinomorphic, paniculate, corymbose or in globose heads. Calyx-lobes valvate, rarely imbricate. Corolla tubular, lobes 4–16, contorted, imbricate or valvate. Stamens epipetalous, as many as the corolla-lobes and alternate with them, or rarely reduced to 1; anthers 2-celled, opening lengthwise. Ovary superior, 2–4-celled; style single; ovules numerous, rarely solitary, axile or ascending from the base of each cell. Fruit a capsule, berry or drupe. Seeds sometimes winged; embryo straight, in the middle of fleshy or cartilaginous endosperm.

Tropics and subtropics generally; resembling *Rubiaceae*, but usually exstipulate and ovary always superior; the genus *Gaertnera* is a link between the two families and closely allied to *Psychotria* (*Rubiaceae*).

Corolla-lobes 6–16, linear-oblong or oblong, much contorted; stamens as many as corolla-lobes .. .. .. .. .. .. .. .. 1. **Anthocleista**
Corolla-lobes 4–5, imbricate or valvate; stamens 4–5, or reduced to 1:
Trees, shrubs or woody climbers; leaves penninerved or conspicuously 3-nerved from near the base; inflorescence paniculate or cymose:
Stamens as many as corolla-lobes:
Stamens inserted low down in the corolla-tube; corolla-lobes imbricate:
Flowers not subtended by large bracts .. .. .. .. .. 2. **Mostuea**
Flowers subtended by large foliaceous bracts .. .. .. 3. **Coinochlamys**
Stamens inserted at or just below the throat of the corolla:
Corolla-lobes imbricate; anther-cells confluent at the apex .. 4. **Lachnopylis**
Corolla-lobes valvate; anther-cells distinct:
Leaves pinnately nerved; stipules connate .. .. .. 5. **Gaertnera**
Leaves 3–5-nerved from the base; stipules rarely present:
Corona absent .. .. .. .. .. .. .. .. 6. **Strychnos**
Corona present .. .. .. .. .. .. .. 7. **Scyphostrychnos**
Stamen 1; leaves penninerved .. .. .. .. .. .. .. 8. **Usteria**
Small few-branched herbs; inflorescence a terminal spike; corolla-lobes valvate; stamens 5 .. .. .. .. .. .. .. .. .. 9. **Spigelia**

## 1. ANTHOCLEISTA Afzel.—F.T.A. 4, 1 : 537.

Leaves with very faint or almost invisible lateral nerves, small, obovate-oblanceolate :

Calyx in bud 1·5–2·5 cm. long :

Calyx in bud about 1·5 cm. long ; corolla-tube 1·5 cm. long, lobes 1 cm. long ; leaves about 15 cm. long and 6 cm. broad, acutely apiculate, without visible lateral nerves, rigidly coriaceous ; cymes few-flowered .. .. .. 1. *obanensis*

Calyx in bud 2·5 cm. long ; corolla-tube 2·5 cm. long, lobes 1·5 cm. long ; leaves about 12 cm. long and 6 cm. broad, acutely apiculate, with about 6 pairs of faintly visible lateral nerves, chartaceous ; cymes 3-flowered ; fruit obovoid, 3·5 cm. long 2. *scandens*

Calyx in bud 6 mm. long :

Corolla-lobes 6–7 ; leaves oblong-elliptic, about 6 cm. long. shortly petiolate and acuminate .. .. .. .. .. .. .. .. 3. *microphylla*

Corolla-lobes 10–12 ; tube 1 cm. long ; leaves narrowly oblong-obovate, rounded and acuminate, about 17 cm. long and 7–8 cm. broad, thin, with 5 pairs of lateral nerves .. .. .. .. .. .. .. .. 4. *micrantha*

Leaves with distinct lateral nerves, medium-sized to large :

Branchlets without spines, usually stout :

Leaf-blade continued to the base, broadly obovate, with about 12 pairs of rather close lateral nerves, very thin ; tertiary nerves distinct ; corolla-lobes 10–12, the tube 3–5 cm. long, rather slender towards the base ; infructescence tending to droop 5. *Frezoulsii*

Leaf-blade not continued to the base, obovate-oblanceolate, up to 20 cm. long, 6–8 cm. broad, with about 8 pairs of lateral nerves, rather thin ; petiole about 3 cm. long ; corolla-tube 2 cm. long, very suddenly contracted at the base ; lobes 10–12 .. .. .. .. .. .. .. .. 6. *Kerstingii*

Branchlets armed with persistent axillary spines :

Corolla-tube nearly three times as long as the lobes, much longer than the calyx ; leaf-blade elongate-obovate, usually long-petiolate, with fewer and distinct lateral nerves ; tertiary nerves invisible ; calyx-lobes ovate-orbicular, 8 mm. long ; corolla-tube 2·5 cm. long, lobes about 12, oblong, 1 cm. long, infructescence erect 7. *nobilis*

Corolla-tube about the same length as the 16–18 lobes, slightly longer than the calyx ; leaves elongate-obovate, up to 45 cm. long and 22 cm. broad, the blade continued to the base and auriculate, without visible tertiary nerves ; calyx-lobes suborbicular, about 12 mm. long ; fruit ovoid-globose, about 3–4 cm. long 8. *Vogelii*

1. **Anthocleista obanensis** *Wernham* in Cat. Talb. Nig. Pl. 67. A glabrous tree with comparatively small leaves, unarmed.
S. Nigeria : Oban ! Obarekkai ! Exsicc.—*Talb.* 305 ; 3025 ; 3105.

2. **A. scandens** *Hook. f.*—F.T.A. 4, 1 : 542. A climbing plant 50 ft. high, with 3-flowered cymes ; calyx green, corolla white.
Fernando Po, 5,000 ft. (Dec.) ! Moka ! Also in the island of St. Thomas. Exsicc.—*Mann* 623. *Mildbr.* 7111.

3. **A. microphylla** *Wernham* l.c. A glabrous tree with leaves quite small for the genus.
S. Nigeria : Oban ! Exsicc.—*Talb.* 304.

4. **A. micrantha** Gilg & Mildbr., ms. An epiphytic shrub.
Fernando Po : north side of St. Isabel, 3,000 ft. (Aug.) ! Also in St. Thomas. Exsicc.—*Mildbr.* 6434.

5. **A. Frezoulsii** *A. Chev.* Bot. 441. *A. nobilis* Baker.—F.T.A. 4, 1 : 538, partly, not of Don. Branches very thick and spineless, prominently marked by the scars of the fallen leaves ; leaves up to 3 ft. 6 in. long ; young fruit ellipsoid, usually obtusely 4-angled, 3 cm. long.
Senegal ! French Guinea : Futa-Jallon, between the Konkouré and Timbo (Mar.) ! Sierra Leone : Regent ! Exsicc.—*Heudelot* 109. *Don.* *Perrottet* 497. *Sc.Elliot* 4145. *Deighton* 1809. *Chev.* 12162 ; 12463 ; 13037. (See Appendix).

6. **A. Kerstingii** *Gilg* in Notizbl. Bot. Gart. Berlin, App. 22, 2 : 33. *A. procera* Leprieur ex A. Chev. Bot. 441. A tall tree of fringing forest, etc.
French Sudan : Guiri, near a marsh (May) ! Togo : Sokode-Basari, etc. ! Exsicc.—*Chev.* 886. *Kersting* 18 ; 18a ; 240 ; 355 ; A. 627. (See Appendix).

7. **A. nobilis** *G. Don* Gen. Syst. 4 : 68.—F.T.A. 4, 1 : 538, partly ; Chev. Bot. 441. *A. parviflora* Baker.—F.T.A. 4, 1 : 539. *A. procera* var. *parviflora*, var. *umbellata* and " var." A. Chev. Bot. 441. *A. djalonensis* A. Chev. Branches spiny ; flowers white, in stiff, branched cymes.
From Casamance and French Guinea to Gold Coast ! Exsicc.—*Afzelius.* *Mann.* *Don.* *Barter.* *Sc. Elliot* 5053 ; 5872. *Lane-Poole* 15. *Dalz.* 984. *Chipp* 354. *Deighton* 512. *G. P. Cooper* 190 ; 380 ; 428. *Linder* 533 ; 542 ; 1021. *Chev.* 12221 ; 12222 ; 12250 ; 12586 ; 12613 ; 12773 ; 12801 ; 12873 ; 13390 ; 14759. *Dinklage* 2420. (See Appendix).

8. **A. Vogelii** *Planch.* in Hook. Ic. Pl. t. 793–4 ; Holl. 3 : 469 (under *A. nobilis*). *A. Talbotii Wernham.* *A. Kalbreyeri* Baker. *A. Zenkeri* Gilg. A tree up to 60 ft. high ; branchlets armed with short axillary spines ; bark of inflorescence transversely rugose ; infructescence drooping.
Liberia : Gbanga (fr. Sept.) ! N. Nigeria : Abinsi ! ? locality ! S. Nigeria : abundant in the Delta (fr. Sept.) ! Oban ! Ambas Bay (Feb.) ! Also in French Cameroons and Spanish Guinea. Exsicc.—*T. Vogel* 51. *Barter* 2104. *Mann* xvi. ; 471. *Dalz.* 638. *Thornewill* 11. *Talb.* 177 ; 2027. *Kalbreyer* 61. *Deistel* 181. *Linder* 533. (See Appendix).

## 2. MOSTUEA Didr.—F.T.A. 4, 1 : 504 (partly).

Leaves more or less ovate or ovate-lanceolate :

Leaves ovate to lanceolate, obtusely acuminate, 2–4 cm. long ; young branchlets scabrid ; flowers in small cymes ; fruit about 4 mm. long, lobes rounded, pubescent 1. *Thomsonii*

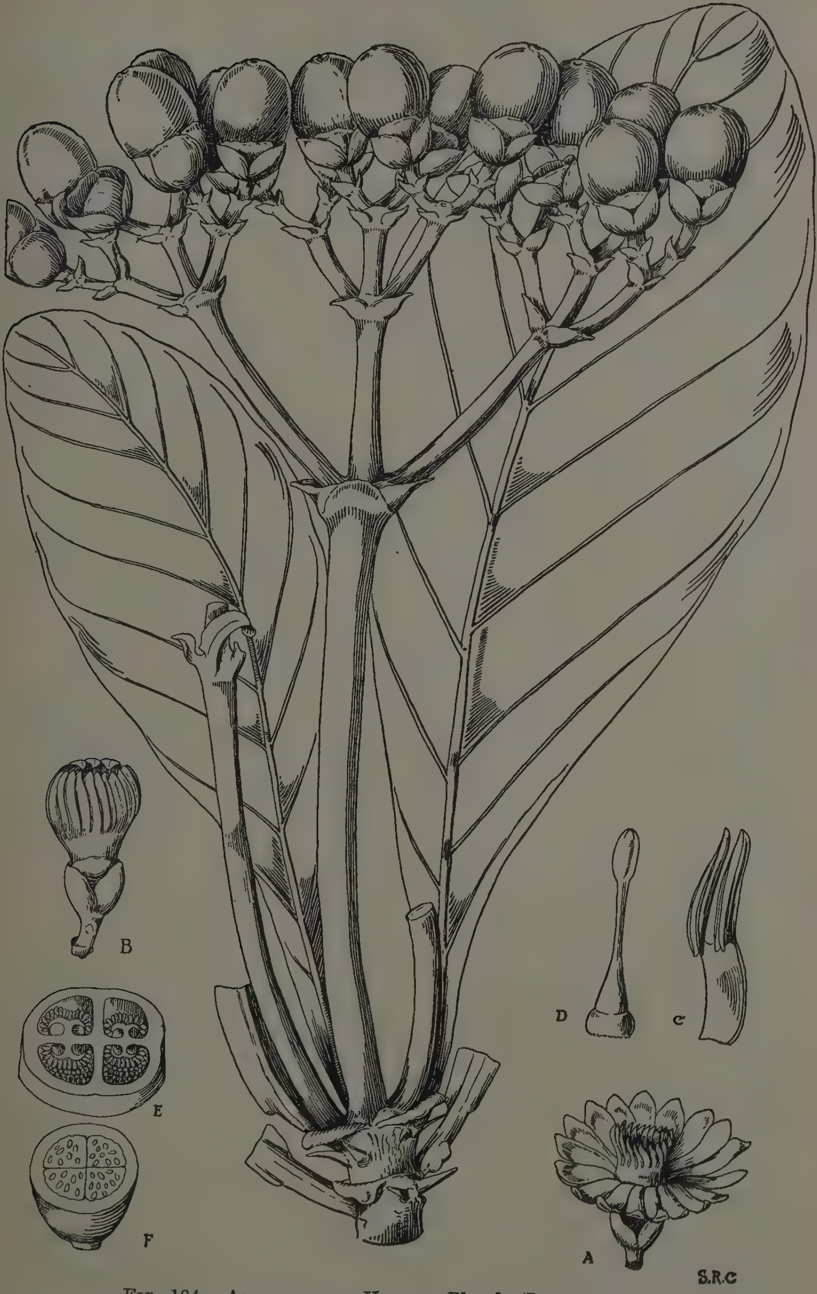

FIG. 184.—ANTHOCLEISTA VOGELII *Planch.* (LOGANIACEAE).

A, flower. B, flower-bud. C, two stamens. D, pistil. E, cross-section of ovary. F, cross-section of fruit.—After Ic. Pl.

Leaves ovate, acutely acuminate, 4–5 cm. long; young branchlets with glabrous strips decurrent from the leaf-bases; corolla 1 cm. long; fruit 1 cm. long, widely bilobed, lobes obtuse to rounded, glabrous, conspicuously nerved 2. *hymenocardioides*

Leaves narrowly oblanceolate, acuminate, 3–6 cm. long, up to 1·5 cm. broad; lateral branchlets nodulose with the leaf-scars; corolla about 1 cm. long; fruit transversely oblong, about 1·3 cm. broad, glabrous .. .. .. .. 3. *angustifolia*

1. **M. Thomsonii** *Benth.*—F.T.A. 4, 1 : 505. A shrub with white flowers $\frac{1}{4}$–$\frac{1}{3}$ in. long.
S. Nigeria: Calabar! Cross R.! Oban! Exsicc.—*Thomson* 44. *Johnston.* *Talb.* 306. *Robb.*
2. **M. hymenocardioides** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A much-branched slender shrub up to 5 ft. high, with flowers 3 in. long, white, with red inside, and winged fruits.
French Guinea: near Dantilia R. (Mar.)! Common on the Niger bank at Farana! Sierra Leone: near Tassin, Scarcies R. (Jan.)! Exsicc.—*Sc. Elliot* 4515; 5268; 5308. *N. W. Thomas* 123; 10013; 10248.
3. **M. angustifolia** *Wernham* in Cat. Talb. Pl. 66. A glabrous shrub with slender branches, and white flowers $\frac{1}{3}$ in. long.
S. Nigeria: Oban! Exsicc.—*Talb.* 1035.

### 3. COINOCHLAMYS T. Anders. ex Benth. and Hook. f. Gen. Pl. 2 : 1091 (*Mostuea* Baker F.T.A. 4, 1 : 504, partly).

Leaves and branchlets clothed with long lax hairs; leaves ovate, acuminate, obtuse to acute at the apex, subsessile; branchlets hirsute; flowers sessile, up to 2 cm. long, subtended by two large ovate bracts; fruits slightly 2-lobed, 1 cm. broad, pubescent *hirsuta*

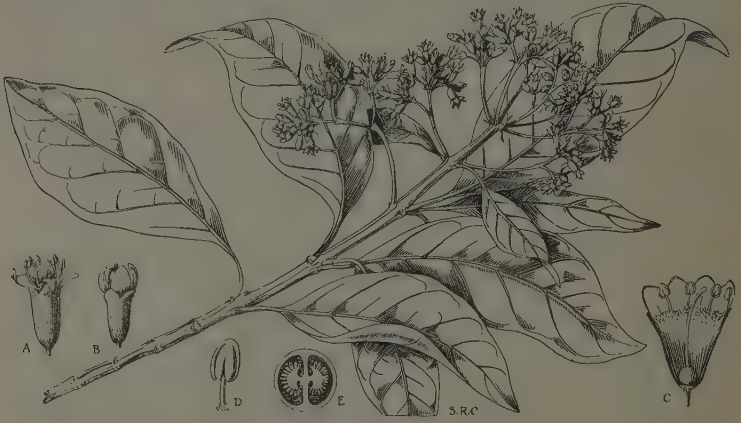

FIG. 185.—LACHNOPYLIS MANNII *Hutch. & M. B. Moss* (LOGANIACEAE).
A and B, flowers. C, flower laid open. D, anther. E, cross-section of ovary.

**C. hirsuta T. Anders.** l.c.; S. Moore in Journ. Bot. 1876: 321, t. 182, fig. 2. *Mostuea hirsuta* Baill.—F.T.A. 4, 1 : 509. Small shrub with white flowers.
Senegambia: among rocks at Karkandy. Sierra Leone: Bagroo R. (Apr.)! Kahreni (Apr.)! Makump (Aug.)! Kamakuia (May)! Rowala (July)! Binkolo (Aug.)! Exsicc.—*Mann* 811. *Sc. Elliot* 5637. *Deighton* 836; 1359. *N. W. Thomas* 265; 353; 1116; 1750; 1824.

### 4. LACHNOPYLIS Hochst. in Flora 26 : 77 (1843); C. A. Smith in Kew Bull. 1930 : 15. (*Nuxia* Auct., partly, not of Lamark).

Leaves entire, oblong to lanceolate-oblong, narrowed at both ends, acute at the apex, 7–10 cm. long, 2–5 cm. broad; petiole up to 2 cm. long; calyx 5 mm. long, with a few lax hairs at the base and on the pedicels .. .. .. .. 1. *Mannii*

Leaves serrate to subentire, elliptic, narrowed at both ends and obtuse at the apex, 4– about 6 cm. long, 2–3·5 cm. broad; petiole 5 mm. long; calyx 6–7 mm. long, shortly puberulous all over .. .. .. .. .. .. ..2. *guineensis*

1. **Lachnopylis Mannii** *Hutch. & M. B. Moss* in Kew Bull. 1931 : ined. *Nuxia Mannii* Gilg—F.T.A. 4, 1 : 512; Chev. Bot. 440. A tree up to 40 ft. high, sometimes a shrub, with verticillate leaves and white flowers in dense paniculate cymes.
French Guinea: Futa-Jallon, in the bush at Diaguissa (Dec.)! Ivory Coast: Upper Sassandra, on Mount Boho, only above 2,500 ft. (May)! Cameroons Mt. 7,000–7,500 ft. (Dec.–Feb.)! Exsicc.—*Chev.* 18011; 21494. *Mann* 1206; 2184. *Maitland* 458; 996.
2. **L. guineensis** *Hutch. & M. B. Moss* l.c. ined. A shrub or small tree 20–25 ft. high with erect branching, the young leaves rather deeply divided, and cream-white flowers in dense cymes.
Sierra Leone: Mount Gonkwi, on rocks fringing precipice 3,000 ft. (Feb.)! Gold Coast: Bana Hill, Krobo! Exsicc.—*Sc. Elliot* 4824. *Irvine* 893.

### 5. **GAERTNERA** Lam.—F.T.A. 4, 1 : 542.

Inflorescence a large loosely paniculate cyme ; peduncle glabrous ; nerves of leaves shortly pilose below or almost glabrous ; leaves chartaceous, elliptic to oblong, acutely acuminate, more or less cuneate at the base, up to 18 cm. long and 7 cm. broad ; calyx about 1 mm. long, bracteole shorter .. .. 1. *paniculata*

Inflorescence compact or small ; peduncle puberulous ; nerves of leaves puberulous below :

Bracteoles ovate or broadly triangular, not longer than the calyx :

Calyx, with the lobes, 3 mm. long ; bracteoles about as long ; corolla-tube about 3 mm. wide ; leaves chartaceous, oblong, truncate to acute at the base, shortly acuminate ; 15–25 cm. long, 7–10 cm. broad ; tertiary nerves prominent ; inflorescence many flowered, compact .. .. .. .. .. .. 2. *Cooperi*

Calyx 1·5–2 mm. long ; bracteoles not half as long ; corolla about 2 mm. wide ; leaves thin, oblong to lanceolate, cuneate, long-acuminate, 8–11 cm. long, 2–3 cm. broad ; tertiary nerves faint ; inflorescence few-flowered, loose 3. *salicifolia*

Bracteoles narrowly triangular or lanceolate, longer than the calyx ; calyx about 3 mm. long ; leaves thin, elliptic to oblong or lanceolate, more or less cuneate, acuminate, up to 12 cm. long and 4·5 cm. broad ; inflorescence very compact 4. *occidentalis*

1. **G. paniculata** *Benth.*—F.T.A. 4, 1 : 543 ; Stapf 632 ; Chev. Bot. 444, partly. *G. eketensis* Wernham. A shrub or tree 10–20 ft. high, with small whitish flowers in a loose pyramidal panicle.
French Guinea to S. Nigeria, common ! Extends to Cameroons and Congo. Exsicc.—*Heudelot* 888. *T. Vogel* 20 ; 71. *Barter* 1256 ; 1811 ; 1877. *Mann* 461. *Moloney. Rowland. Sc. Elliot* 3860 ; 5326. *Cummins* 194. *Millen* 15 ; 140. *Talb.* 3391. *Linder* 1487 B ; 1536. *Baumann* 494. (See Appendix).
2. **G. Cooperi** *Hutch. & M. B. Moss* in Kew Bull. 1931 : ined. *G. paniculata* A. Chev. Bot. 444, partly, not of Benth. A tree 10–25 ft. high, with shining leaves and white flowers in compact paniculate terminal cymes.
French Guinea : Futa-Jallon, Diaguissa-Ditinn and district (Apr.) ! Liberia : several localities ! Exsicc.—*G. P. Cooper* 202 ; 287 ; 465. *Linder* 286 ; 1487 A. *Whyte. Chev.* 12420 ; 12664 ; 12936. (See Appendix).
3. **G. salicifolia** *Hutch. & Gillett* in Kew Bull. 1931 : ined. A tree 20 ft. high, bark reddish-green.
Liberia : Dukwia River (June) ! Exsicc.—*G. P. Cooper* 277. (See Appendix).
4. **G. occidentalis** *H. Baill.*—F.T.A. 4, 1 : 544 ; Chev. Bot. 444. A bush, 5 ft. high, nearly glabrous ; flowers white, $\frac{1}{4}$–$\frac{1}{3}$ in. long in terminal branched cymes.
French Guinea : Ditinn ! Sierra Leone : Falaba (Apr.) ! Gengaru Rd. Kambui Reserve (May) ! Bagroo River ! Rowalla (July) ! Liberia : Gbanga ! Ivory Coast : Indenié, Borobo (Mar.) ! Exsicc.—*Sc. Elliot* 5908. *Lane-Poole* 246. *Aylmer* 45. *N. W. Thomas* 1033. *Mann* 802. *Linder* 758. *Deighton* 1663. *Chev.* 12984 ; 17661.

### 6. **STRYCHNOS** Linn.—F.T.A. 4, 1 : 517.

Inflorescence always terminal :

Branchlets usually armed with axillary spines ; throat of corolla villous ; leaves broadly obovate to orbicular ; calyx-lobes linear-lanceolate, about 5 mm. long, puberulous .. .. .. .. .. .. .. .. .. 1. *spinosa*

Branchlets without spines ; leaves ovate-elliptic, long-acuminate, rounded at the base, 5–8 cm. long, 3–4 cm. broad, thin, glabrous ; stipules subulate ; flowers very small ; calyx-lobes subulate ; corolla-tube very short ; bracts subulate 2. *Lecomtei*

Inflorescence axillary and rarely also terminal ; branchlets rarely with spines :

Branchlets with small internodal prickles ; leaves oblong, acuminate, about 16 cm. long and 7 cm. broad, conspicuously 3-nerved from near the base .. 3. *aculeata*

Branchlets without prickles :

Leaves rounded at the apex (never acuminate) :

Leaves elliptic to obovate-elliptic, 5–8 cm. long and 2–4 cm. broad ; flowers subfasciculate, about 6 mm. long ; calyx-lobes ciliate ; fruit ellipsoid, 3–4 cm. diam. 4. *triclisioides*

Leaves broadly obovate ; flowers shortly cymose on a fairly long peduncle 5. *Afzelii*

Leaves acuminate or shortly pointed :

Leaves obovate or oblanceolate, cuneate from about the middle to the base :

Inflorescence markedly pedunculate, with a small dense cymule of flowers ; leaves obovate ; fruits about 1 cm. diam. .. .. .. .. .. 5. *Afzelii*

Inflorescence sessile, few-flowered ; corolla-tube pubescent outside ; leaves oblanceolate, gradually acuminate, up to 8 cm. long and 3 cm. broad, pubescent on the midrib below .. .. .. .. .. .. .. 6. *soubrensis*

Leaves elliptic or only slightly obovate and shortly cuneate at the base :

Cymes sessile or subsessile, branched from the base or very near the base :

Corolla pubescent outside, about 5 mm. long ; sepals ciliate and slightly pubescent ; leaves up to 15 cm. long, glabrous .. .. .. 7. *memecyloides*

Corolla glabrous or papillose outside :

Corolla-tube about 3–4 times as long as the lobes, about 6 mm. long, villous at the throat ; style much exserted ; leaves 12–17 cm. long and 5–8 cm. broad ; fruits ellipsoid, about 2 cm. long .. .. .. .. 8. *littoralis*

Corolla-tube short, at most twice as long as the lobes :

Leaves long-tailed-acuminate :

Inflorescence subfasciculate, only slightly longer than the petiole ; corolla up to 6 mm. long, villous at the throat .. .. .. 9. *tricalysioides*

Inflorescence racemose-cymose up to half as long as the leaves or more; flowers minute .. .. .. .. .. .. 10. *venulosa*
Leaves shortly or gradually acuminate :
Leaves oblong-lanceolate ; tendrils simple :
Leaves narrowly oblong-lanceolate, cuneate at the base, about 6 cm. long and 2 cm. broad ; midrib raised above, tomentellous 11. *cinnabarina*
Leaves broader than above, rounded at the base, about 8 cm. long and 3 cm. broad ; midrib depressed above.. .. .. .. .. 12. *pansa*
Leaves elliptic or ovate-elliptic :
Axis of inflorescence and calyx puberulous :
Leaves up to 16 cm. long and 6·5 cm. broad ; flowers about 1 cm. long 13. *Staudtii*
Leaves about 5–10 cm. long and 3–5 cm. broad ; flowers about 5 mm. long 14. *Moloneyi*
Axis of inflorescence glabrous :
Inflorescence subracemose-cymose ; branchlets without tendrils ; corolla 6–7 mm. long, villous at the throat ; leaves up to 15 cm. long and 6·5 cm. broad, glabrous .. .. .. .. .. .. 15. *syringiflora*
Inflorescence a dense cluster :
Branchlets without tendrils ; leaves up to 15 cm. long and 7 cm. broad ; sepals broadly ovate, much imbricate, ciliate .. 16. *densiflora*
Branchlets with usually forked tendrils :
Leaves about 8 cm. long and 4 cm. broad ; sepals slightly imbricate 17. *Barteri*
Leaves 15–18 cm. long and about 7 cm. broad ; sepals much imbricate ; branchlets of inflorescence glabrous .. .. .. 18. *camptoneura*
Cymes pedunculate :
Flowers minute :
Leaves elliptic to oblong, sharply acuminate, cuneate at the base, up to 16 cm. long and 7 cm. broad .. .. .. .. .. .. 19. *pusilliflora*
Leaves elliptic to ovate, obtusely acuminate, rounded to shortly cuneate at the base, about 8 cm. long and 4 cm. broad .. .. .. .. 20. *Cooperi*
Flowers not minute :
Flowers very numerous ; cyme much branched :
Leaves elliptic, up to 16 cm. long and 7 cm. broad, cuneate at the base 21. *eketensis*
Leaves broadly elliptic, about 8 cm. long and 5·5 cm. broad, abruptly and very shortly and obliquely acuminate, subrounded at the base 22. *Dinklagei*
Flowers few ; cymes little-branched :
Flowers about 1 cm. long ; sepals broadly ovate and much imbricate, about 5 mm. long, ciliate ; leaves elliptic-oblong, up to about 12 cm. long and 6 cm. broad, acuminate .. .. .. .. .. .. 23. *nigritana*
Flowers about 6 mm. long ; sepals 1 mm. long ; leaves narrowly elliptic to oblong, about 10 cm. long and 3·5 cm. broad ; fruit globose, 1·5–2 cm. diam. 24. *Johnsonii*

1. **Strychnos spinosa** *Lam.*—F.T.A. 4, 1 : 536 ; Holl. 3 : 468 ; Chev. Bot. 444. *S. djalonis* A. Chev. Bot. 422. A small tree up to 15 ft. high with stiff horizontal branchlets, greenish-white flowers in short compound cymes, and hard-shelled yellow fruit.

Senegal and French Sudan to Nigeria ! Throughout tropical Africa to S. Africa ; also in the Mascarene Islands. Exsicc.—*Heudelot* 813. *Y. Vogel* 195. *Barter* 1140. *Rowland. Sc. Elliot* 5384. *Ozanni* 39. *Dalz.* 924. *Chipp* 489 ; 764. *Chev.* 12179 bis; 12461 ; 12716 ; 12766. (See Appendix).

var. **pubescens** *Baker*—F.T.A. 4, 1 : 537. Branchlets and leaves softly pubescent.

French Guinea : near Moria, on Scarcies R. (Feb.) ! Gold Coast : Kulmasa to Tagalo (Feb.) ! N. Nigeria: Nupe ! Abinsi and vicinity ! Katagum district ! Exsicc.—*Sc. Elliot* 4801. *Kitson* 665. *Barter* 1705. *Dalz.* 373 ; 721.

2. **S. Lecomtei** *A. Chev.* Bot. 443. A scrambling shrub without tendrils and with glabrous branchlets.

Ivory Coast : Bingerville and environs ! Exsicc.—*Chev.* 15402 ; 15407.

3. **S. aculeata** *Solered.*—F.T.A. 4, 1 : 520 ; Chev. Bot. 443. A lofty spiny climber with large fruits.

Sierra Leone : Bagroo R. (Apr.) ! Ivory Coast : Sassandra valley, at Guidéko (May) ! Alépé, in the forest (Mar.) ! S. Nigeria : Oban ! Fernando Po (Jan.) ! Also in Cameroons. Exsicc.—*Mann* 175 ; 853. *Talb.* 1381. *Chev.* 16368 ; 17894. (See Appendix).

4. **S. triclisioides** *Baker*—F.T.A. 4, 1 : 533. *S. alnifolia* Baker. *S. dshurica* A. Chev. Bot. 443. A tree with small greenish-yellow flowers $\frac{1}{4}$ in. long ; fruits 2 in. across.

French Sudan : between Ouassana and Dendéla ! French Guinea : Kankan ! Gold Coast : various localities ! N. Nigeria : Nupe ! Sokoto (May) ! Yola (Apr.) ! Katagum ! Bauchi Plateau (Feb.) ! S. Nigeria : Lagos Colony ! Extends to E. Sudan, and in Angola. Exsicc.—*Barter* 1160. *Dalton. Rowland. Shaw* 45. *Dalz.* 197 ; 421. *Lely* P. 155 ; 836. *Kitson* 664 ; 775 ; 834 ; 909. *Chev.* 571 ; 623. *Pobéguin* 860. (See Appendix).

5. **S. Afzelii** *Gilg*—F.T.A. 4, 1 : 522. *S. zizyphoides* Baker. *S. erythrocarpa* A. Chev. *S. Caryophyllus* A. Chev. A climbing shrub with shining leaves and very small whitish flowers.

Sierra Leone : various localities ! Liberia : Peáhtah (Oct.) ! Dukwia R. (Feb.) ! Ivory Coast : Middle Sassandra, Guidéko to Soubré (June) ! Mt. Kouan, summit (Apr.) ! Gold Coast : Wurubong to Ikraji (May) ! Exsicc.—*Sc. Elliot* 4015 ; 4480 ; 4552. *N. W. Thomas* 1442 ; 2583 ; 3845. *G. P. Cooper* 180. *Kitson* 1138. *Linder* 176 ; 909. *Burton & Cameron. Chev.* 19100 ; 21272. (See Appendix).

6. **S. soubrensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A climbing shrub.

Ivory Coast : Sassandra Valley, near Soubré (May) ! Exsicc.—*Chev.* 17994.

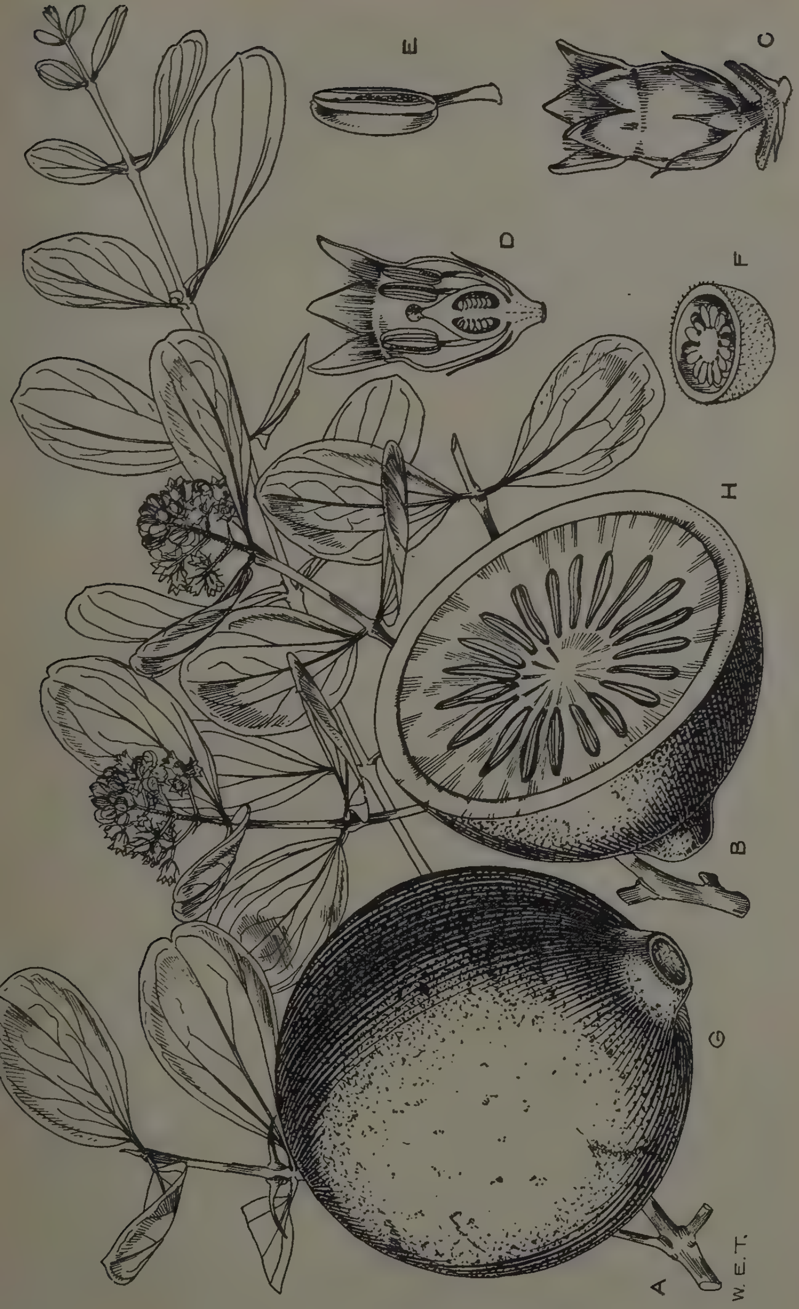

FIG. 186.—STRYCHNOS SPINOSA *Lam.* (LOGANIACEAE).

A, leafy, and B, flowering shoot. C, flower. D, longitudinal section of flower. E, stamen. F, cross-section of ovary. G, fruit. H, cross-section of fruit.

7. **S. memecyloides** *S. Moore* in Cat. Talb. Nig. Pl. 69. *S. Talbotiae* S. Moore. An erect shrub with shining leaves comparatively large, and whitish flowers in short pubescent axillary cymes.
S. Nigeria: Oban! Exsicc.—*Chev.* 17994. *Talb.* 2077; 2078; 2079.

8. **S. littoralis** *A. Chev.* Bot. 443, name only. A climbing shrub.
Ivory Coast: Cavally Basin, sea-coast between Tabou and Bériby (Aug.)! S. Nigeria: Lagos, Ikoyi (Aug.)! Cameroons Mt., Likomba (Oct.)! Exsicc.—*Mildbr.* 10521; 10527. *Dalz.* 1415. *Chev.* 19953.

9. **S. tricalysioides** *Hutch. & M. B. Moss* in Kew Bull. 1931: ined. A climbing shrub with yellowish-white flowers.
S. Nigeria: Cameroons Mt., Likomba (Oct.)! Exsicc.—*Mildbr.* 10576.

10. **S. venulosa** *Hutch. & M. B. Moss* in Kew Bull. 1931: ined. A climbing shrub; fruit globose, smooth, ⅔ in. in diameter.
Sierra Leone: Falaba (Apr.)! Liberia: Peáhtah (Oct.)! Exsicc.—*Aylmer* 58. *Linder* 1073; 1084

11. **S. cinnabarina** *Gilg*, MS.
S. Nigeria: Eket! Extends to Cameroons. Exsicc.—*Talb.* (no number).

12. **S. pansa** *S. Moore* in Cat. Talb. Nig. Pl. 68. A climbing shrub.
S. Nigeria: Oban! Exsicc.—*Talb.* 1661.

13. **S. Staudtii** *Gilg*—F.T.A. 4, 1: 528. An erect unarmed shrub with glabrous branchlets, and whitish flowers comparatively large with a hairy throat, numerous in short axillary cymes.
S. Nigeria: Johann-Albrechtshöhe! Exsicc.—*Staudt* 616.

14. **S. Moloneyi** *Baker*—F.T.A. 4, 1: 527. *S. togoensis* Gilg & Busse. *S. chrysocarpa* Baker. *S. Warneckei* Gilg. A glabrous shrub, straggling or climbing, with small flowers in shortly-peduncled axillary cymes, and orange-yellow globose fruits ¾ in. or more in diameter.
Sierra Leone: various localities! Liberia: Banga (Oct.)! Gold Coast: Axim! Kwase, Cape Coast district (Nov.)! Accra! Togo: Lome! Sokode (fr. Nov.)! S. Nigeria: near Lagos! Onitsha! Oban! Cameroons Mt., Tiko (Jan.)! Exsicc.—*Barter* 1813. *H. H. Johnston* 98. *Burton & Cameron. Moloney. Sc. Elliot* 5431. *Rowland. Talb.* 157. *Dunlap* 168. *Linder* 1242. *Warnecke* 369. *Kersting* 691. (See Appendix).

15. **S. syringiflora** *A. Chev.* in Bull. Soc. Bot. Fr. Mém. 8b; 48; Bot. 444. Shrub, branched from the base, unarmed.
French Guinea: Kaba valley (May)! Sierra Leone: Kahreni, Limba (Apr.)! "Konnoh" Country! Exsicc.—*Sc. Elliot* 5592. *Burbridge* 485. *Chev.* 13181; 13191 bis.

16. **S. densiflora** *Baill.*—F.T.A. 4, 1: 528. *S. Jollyana* A. Chev. ? A shrub with glabrous branchlets, and yellowish fragrant flowers ¼ in. long hairy in the throat.
Senegambia: no precise locality! Sierra Leone: Falaba (Mar.)! Ivory Coast: Sassandra Basin, Guidéko! S. Nigeria: Oban! Exsicc.—*Heudelot* 861. *Sc. Elliot* 5406. *Talb.* (no number). *Chev.* 16351; 16360; 16395.

17. **S. Barteri** *Solered.*—F.T.A. 4, 1: 523. A glabrous climbing shrub with white fragrant flowers ½ in. long in globose axillary clusters, and fruits 1 in. in diameter.
Sierra Leone: Limba, near Madina (Apr.)! Rowalla (July)! S. Nigeria: Onitsha! Ubulubu! Exsicc.—*Barter* 1247; 1759. *Sc. Elliot* 5569; 5659. *N. W. Thomas* 1055; 2265.

18. **S. camptoneura** Gilg.
S. Nigeria: Victoria! Also in French Cameroons. Exsicc.—*Buckholz* 14.

19. **S. pusilliflora** *S. Moore* in Cat. Talb. Nig. Pl. 70. A climbing shrub, glabrous, with comparatively large leaves strongly 3-nerved, and very small flowers in slender open axillary cymes.
S. Nigeria: Oban! Exsicc.—*Talb.* 1256.

20. **S. Cooperi** *Hutch. & M. B. Moss* in Kew Bull. 1931: ined. A climbing shrub with obliquely-nerved leaves and small flowers in lax axillary cymes about 1 in. long.
Liberia: Dukwia R. (Mar.)! Exsicc.—*Cooper* 300.

21. **S. eketensis** *S. Moore* in Journ. Bot. 1914: 29. Apparently a climbing shrub with ribbed branches, shining rather large coriaceous leaves, the midrib very prominent, and flowers nearly ¼ in. long.
S. Nigeria: Eket! Exsicc.—*Talb.* 3237.

22. **S. Dinklagei** *Gilg*—F.T.A. 4, 1: 520; Stapf 632. A straggling (? climbing) shrub, with nearly 4-angled branchlets turning blackish in drying, and coriaceous shining leaves 3-nerved from the base.
Liberia: Grand Bassa! Exsicc.—*Dinklage* 2100.

23. **S. nigritana** *Baker*—F.T.A. 4, 1: 523. *S. ciliicalyx* Gilg. *S. Vogelii* Bak. *S. Fleuryana* A. Chev. Bot. 433. A glabrous climbing shrub with forked tendrils, shining leaves and creamy or dull yellow flowers in shortly pedunculate axillary cymes.
Ivory Coast: Ahinta in the Sanvi (Mar.)! Lower Cavally, between Prolo and Blérion (Aug.)! Gold Coast: at waterfall near Kintampo (Mar.)! Dahomey: Little Popo (cult.)! N. Nigeria: Nupe! S. Nigeria: Ikoyi (Apr.)! Epe! Idah (Sept.)! Exsicc.—*T. Vogel* 49. *Barter* 2232; 3249. *Dalz.* 19 (Gold Coast); 1154. *Chev.* 17754; 19888. *Schlechter* 12957.

24. **S. Johnsonii** *Hutch. & M. B. Moss* in Kew Bull. 1931: ined. A climbing shrub with forked tendrils and pale yellow flowers.
Sierra Leone: near Buyabuya, Scarcies! Gold Coast: Akropong (Oct.)! Togo: Misahöhe (Nov.)! Exsicc.—*Johnson* 802. *Sc. Elliot* 4292. *Mildbr.* 7336.

*Imperfectly known species.*

**S. odorata** *A. Chev.* Bot. 443, name only.
Ivory Coast: several localities! Exsicc.—*Chev.* 15435; 17404; 17765; 17895; 19273.

## 7. SCYPHOSTRYCHNOS S. Moore in Cat. Talb. Nig. Pl. 71 (1913).

Leaves broadly elliptic, up to 20 cm. long and 12 cm. broad, thick and coriaceous, glabrous; petiole about 1·2 cm. long, stout, glabrous; inflorescence a loosely-branched few-flowered axillary cyme up to 6 cm. long; calyx-lobes 5, broadly ovate, ciliate; corolla about 1 cm. long, lobes 5, about as long as the tube, narrowly oblong; corona lobes at the throat of the corolla, half as long as the corolla-lobes, truncate, slightly ciliate; stamens attached to the base of the corona .. .. .. *Talbotii*

**S. Talbotii** *S. Moore* in Cat. Talb. Nig. Pl. 71, t. 10. Probably a shrub, with axillary tendrils and loose cymes of small flowers.
S. Nigeria: Oban! Exsicc.—*Talb.* 1664.

## 8. USTERIA Willd.—F.T.A. 4, 1: 517.

A climber with long internodes and smooth glabrous branchlets; leaves broadly elliptic, subacute to rounded at the apex, about 10 cm. long and 6 cm. broad, with 3–4 pairs of conspicuous lateral nerves; inflorescence a lax terminal panicle, minutely puberulous ; enlarged calyx-lobe narrowly obovate, almost 1 cm. long ; corolla 1–1·5 cm. long ; stamen 1 ; fruit a capsule, oblong, 2-valved, 3·5 cm. long, 1 cm. broad *guineensis*

**U. guineensis** *Willd.*—F.T.A. 4, 1 : 517 ; Stapf 632 ; Chev. Bot. 442. Twining and climbing with shining leaves and whitish or lilac flowers with one large pale calyx-lobe.

Common throughout the area from Senegal and French Sudan to S. Nigeria ! Also in Cameroons. Exsicc. —*Heudelot* 597. *Don.* *Mann* 460. *Brown-Lester* 37. *Sc. Elliot* 4025 ; 4243 ; 4317 ; 5497. *Rowland.* *Millen* 23. *Johnson* 1079. *Whyte.* *Farmar* 169. *Dalz.* 1232 ; 8088. *Talb.* 3028. *Linder* 3 ; 245. *Pobéguin* 280 ; 639. (See Appendix).

### 9. **SPIGELIA** Linn. Gen. ed. 1 : 361 (1737).

A herb up to 40 cm. high ; stems glabrous ; leaves 4 in a whorl at the end of the stem, broadly lanceolate, gradually acute, subsessile, 5–7 cm. long, 1·5–2·5 cm. broad, slightly scabrid on both surfaces ; stipules connate ; flowers in terminal secund racemes up to 10 cm. long ; calyx 2 mm. long, segments narrow, acute ; corolla narrowly funnel-shaped, 1 cm. long, with 5 small lobes ; fruit 5 mm. diam., 2-lobed, the upper part warted ; disk boat-shaped and persisting after the fall of the fruit *Anthelmia*

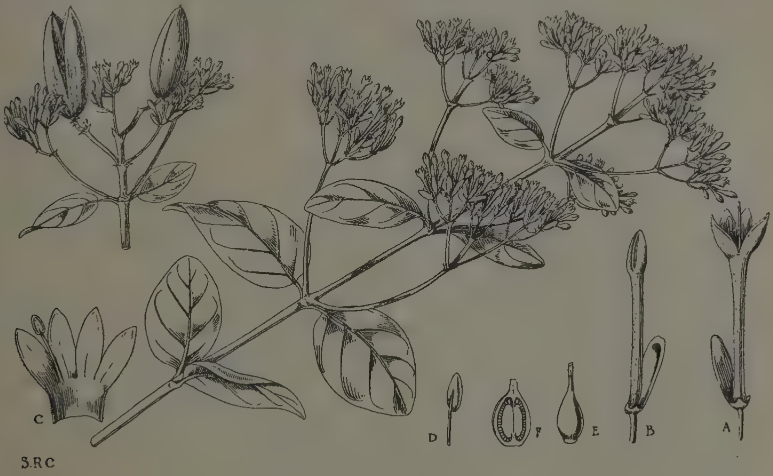

FIG. 187.—USTERIA GUINEENSIS *Willd.* (LOGANIACEAE).

A, flower. B, the same in bud. C, upper part of corolla opened to show the solitary stamen. D, anther. E, ovary. F, longitudinal section of ovary.

**S. Anthelmia** *Linn.* Sp. Pl. 149 ; Holl. 3 : 469. A common weed in towns, on roads and railways ; native of tropical America and naturalised in Africa.

Sierra Leone : Freetown ! Makump ! Binkolo ! Liberia : Monrovia (Nov.) ! S. Nigeria : Lagos, common ! Exsicc.—*Deighton* 1284 ; 1708 ; 2061. *Dawe* 505. *Linder* 1540.

## 120. OLEACEAE

Trees, shrubs or climbers. Leaves opposite or very rarely alternate, simple or pinnate ; stipules absent. Flowers hermaphrodite or rarely unisexual, actinomorphic. Calyx lobed or dentate. Petals present, free or connate, often 4, imbricate or induplicate-valvate. Stamens hypogynous or epipetalous, usually 2 ; anthers apiculate, 2-celled, cells back to back, opening lengthwise. Disk absent. Ovary superior, 2-celled, style simple with a capitate or bifid stigma ; ovules numerous in each cell, axile pendulous or ascending. Fruit baccate or drupaceous ; seeds usually with endosperm ; embryo straight, the radicle sometimes hidden within the base of the cotyledons.

A small family easily recognised by the woody habit, opposite leaves without stipules and the two stamens.

Petals free or nearly so, very narrow ; leaves simple .. .. 1. **Linociera**

Petals united into a short or long tube :

Corolla-tube very short ; lobes induplicate-valvate ; leaves simple .. 2. **Olea**

Corolla-tube medium to quite long ; lobes imbricate :

Fruit hard and woody, 2-valved ; seeds winged ; leaves simple (in ours) 3. **Scbrebera**

Fruit a berry ; seeds not winged ; leaves simple or pinnate .. 4. **Jasminum**

### 1. **LINOCIERA** Sw.—F.T.A. 4, 1 : 19 ; Gilg and Schellenberg in Engl. Bot. Jahrb. 51 : 67.

Inflorescence a sessile or subsessile cluster and few-flowered ; leaves oblong, bluntly acuminate at the apex, up to 16 cm. long and 6 cm. broad ; bracts and sepals hairy ; fruits obovoid, about 2·5 cm. long and 1·5 cm. broad .. .. .. 1. *congesta*

Inflorescence branched, many-flowered :

Inflorescence axes, bracts and sepals glabrous or very sparingly hairy :

Inflorescence a much-branched cyme about 5 cm. long ; leaves oblong, gradually and broadly acuminate to obtuse at the apex, about 18 cm. long and up to 6 cm. broad, lateral nerves about 10 pairs conspicuous above and below, with a subglabrous pit in the axils below ; fruits ellipsoid, 2 cm. long and 1·2 cm. broad 2. *nilotica*

Inflorescence very short and racemose-cymose, few-flowered ; leaves narrowly elliptic to oblanceolate, up to 15 cm. long and 4·5 cm. broad, lateral nerves about 6 pairs, without or with very minute pits in the axils, inconspicuous ; fruits ellipsoid, 1·4 cm. long and 1 cm. broad .. .. .. 3. *Lingelsheimiana*

Inflorescence axes, bracts and sepals appressed-tomentose ; leaves broadly elliptic to narrowly oblong, about 22 cm. long and up to 10 cm. broad, with about 8 pairs of lateral nerves hairy in the axils below :

Corolla about 1 cm. long .. .. .. .. .. .. 4. *Johnsonii*

Corolla about 5 mm. long .. .. .. .. .. .. .. 5. *oreophila*

1. **Linociera congesta** *Baker*—F.T.A. 4, 1 : 20. A shrub 15 ft. high.
S. Nigeria : Cameroons River (Jan.). Also in Gabon. Exsicc.—*Mann* 2214.

2. **L. nilotica** *Oliv.*—F.T.A. 4, 1 : 19 ; Chev. Bot. 399. A shrub or tree with small creamy highly perfumed flowers.
Togo : Sokode ! Dahomey : from Kouande to Konkobiri (June) ! N. Nigeria : Bauchi Plateau, Naraguta. (Nov.). Zaria district (Feb.) ! S. Nigeria : Oban. Extends to the Cameroons, Eastern Sudan and Uganda, Exsicc.—*Kersting* A. 176. *Lely* 724. *Dalz.* 366. *Chev.* 24265. *Thomas* 2134.

3. **L. Lingelsheimiana** *Gilg & Schellenb.* in Engl. Bot. Jahrb. 51 : 72. *L. Mannii* Baker—F.T.A. 4, 1 : 19, not of Solereder. *L. sudanica* A. Chev. *L. macroura* Gilg & Schellenb. A small tree with glabrous branchlets.
French Sudan : Banfara, edge of a marsh (Mar.) ! Bobo-Dioulasso (May) ! Sierra Leone : Way to Kukuna, Scarcies River (fruiting Jan.). Yonibana. Ivory Coast : Zaranou ! N. Nigeria : Bauchi Plateau (Jan.). S. Nigeria : Victoria ! Exsicc.—*Sc. Elliot* 4717. *Thomas* 4139. *Chev.* 535 ; 903 ; 16285. *Lely* P. 53. *Preuss* 1113 ; 1200 ; 1282a.

4. **L. Johnsonii** *Baker*—F.T.A. 4, 1 : 20. *L. fragrans* Gilg & Schellenb. *L. angolensis* Baker—F.T.A. 4, 1 : 20, partly. Shrubby tree ; flowers creamy white, sweetly scented.
Sierra Leone : Kafoko ! Gold Coast : no locality (Dec.). Aburi Hills (Nov.). Also in Uganda. Exsicc.—*Johnson* 148 ; 234 ; 453. *Thomas* 2134.

5. **L. oreophila** *Gilg & Schellenb.* in Engl. Bot. Jahrb. 51 : 70.
Cameroons Mt., Buea ! Also in French Cameroons. Exsicc.—*Deistel* 85.

### 2. **OLEA** Linn.—F.T.A. 4, 1 : 17.

Leaves oblong-elliptic, acute at the base, narrowly and acutely acuminate, 7–14 cm. long, 3–5 cm. broad, glabrous, with a very prominent midrib and faint lateral nerves and obscure venation ; petiole 1–1·5 cm. long ; cymes terminal, shorter than the upper leaves, glabrous ; bracts subulate, 2 mm. long ; calyx with short triangular lobes ; corolla 3 mm. long ; mature ovary glabrous ; fruits not seen *guineensis*

**O. guineensis** *Hutch. & C. A. Smith* in Kew Bull. 1931 : ined. *O. Hochstetteri* A. Chev. Bot. 399, not of Baker. A glabrous tree or shrub.
Ivory Coast : Upper—Cavally, Dyola country, Mt. Momy, 2,800 ft. (Apr.) ! Cameroons Mt. above Musake, 6,000 ft. (Mar.) ! Exsicc.—*Chev.* 21358. *Maitland* 498.

### 3. **SCHREBERA** Roxb.—F.T.A. 4, 1 : 13.

Branchlets with large lenticels ; leaves broadly elliptic, slightly decurrent at the rounded base, shortly acuminate, 8–18 cm. long, 7–12 cm. broad, glabrous, with 7–8 pairs of lateral nerves, laxly and finely reticulate ; petiole glabrous, 2–3 cm. long ; flowers not seen ; fruits shortly club-shaped, 5–6 cm. long, lenticellate ; seeds about 4 cm. including the wing .. .. .. .. .. .. .. .. 1. *arborea*

Branchlets with few lenticels ; leaves oblong-elliptic, rather long-acuminate, 10–18 cm. long, 6–8 cm. broad, glabrous, with about 10 pairs of lateral nerves ; petiole softly tomentellous, 1–1·5 cm. long ; flowers not seen ; fruits obovoid, 5 cm. long ; seeds 4 cm. long including the wing .. .. .. .. .. 2. *Chevalieri*

1. **S. arborea** *A. Chev.* in Bull. Soc. Bot. Fr. Mém. 8 D. 180 ; Bot. 399. A broad-leaved tree, with fruits dehiscing at the top, and winged seeds.
Ivory Coast : Anoumaba, in forest (fr. Nov.) ! Exsicc.—*Chev.* 22352.

2. **S. Chevalieri** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A small tree 15–20 ft. high.
Senegal : Casamance, Sinedone (fr. Jan.) ! Exsicc.—*Chev.* 3532.

**4. JASMINUM** Linn.—F.T.A. 4, 1 : 1 ; Gilg & Schellenb. in Engl. Bot. Jahrb. 51 : 77 (1913).

Leaves simple :

Branchlets, leaves and calyx glabrous :

Corolla-lobes ovate ; leaves ovate or ovate-elliptic, acuminate, about 7 cm. long and 4·5 cm. broad, with 3–4 pairs of prominent lateral nerves ; calyx very shortly toothed ; corolla-tube 1·5–2·5 cm. long ; fruits obliquely ellipsoid, 1·5–2 cm. long 1. *dichotomum*

Corolla-lobes linear, 1 cm. long ; leaves oblong-elliptic, very acutely acuminate, 7–9 cm. long, 3–3·5 cm. broad, with about 4 pairs of lateral nerves ; calyx-lobes subfiliform, 5–6 mm. long ; corolla-tube 1·5 cm. long .. .. 2. *Dinklagei*

Branchlets, leaves and calyx pubescent ; corolla-lobes linear or oblong-elliptic :

Branchlets and leaves clothed with long spreading hairs ; corolla-lobes nearly as long as the tube, the latter nearly 2 cm. long ; leaves ovate-elliptic to obovate, acutely acuminate, cordate at the base, about 7 cm. long and 3 cm. broad, setose-pilose on both surfaces ; calyx-lobes filiform, 6–7 cm. long .. .. 3. *Preussii*

Branchlets and leaves shortly pubescent or nearly glabrous :

Corolla-lobes oblong-elliptic ; leaves elliptic-suborbicular, rounded at the apex, rounded at the base, up to 6 cm. long and 4 cm. broad ; calyx-lobes linear-subulate, about 4 mm. long .. .. .. .. .. .. .. 4. *obtusifolium*

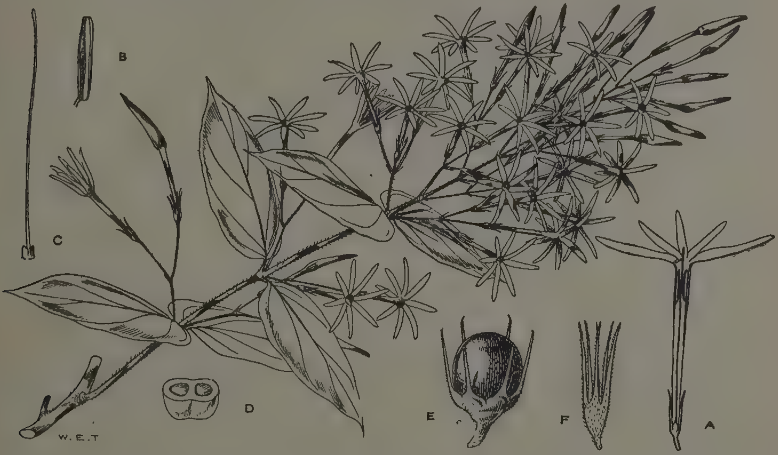

Fig. 188.—Jasminum pauciflorum *Benth.* (Oleaceae).

A, flower, longitudinal section. B, anther. C, pistil. D, cross-section of ovary. E, fruit. F, calyx.

Corolla-lobes linear :

Leaves ovate-elliptic, triangular-acuminate, rounded or subcordate at the base, up to 7 cm. long and 4 cm. broad ; calyx-lobes linear-subulate, about 4 mm. long .. .. .. .. .. .. .. .. 5. *pauciflorum*

Leaves narrowly lanceolate, mucronate, narrowed to the base, 7–10 cm. long, 1·5–2 cm. broad, 3-nerved from above the base, minutely pubescent below ; stems short from a woody rhizome, puberulous ; flowers 3–4 together ; calyx-lobes filiform, 7 mm. long ; corolla-tube 2 cm. long, lobes 1·4 mm. long 6. *Kerstingii*

Leaves trifoliolate :

Branchlets leaves and inflorescence shortly pubescent ; pedicels up to 6 mm. long ; corolla-tube 2·5 cm. long, lobes obovate, 1 cm. long ; leaflets ovate to ovate-lanceolate, the terminal one up to 7 cm. long and 4 cm. broad ; calyx denticulate ; fruits subglobose, 1 cm. diameter .. .. .. .. .. .. 7. *mauritianum*

Branchlets and leaves glabrescent ; inflorescence softly tomentose ; pedicels very short ; corolla-tube 1·4 cm. long, lobes ovate, 4–5 mm. long ; leaflets ovate, acute, the terminal one about 8 cm. long and 4 cm. broad, with tuft of hairs in the axils of the nerves below ; calyx dentate ; fruits broadly ellipsoid, about 1 cm. long 8. *Bakeri*

1. **Jasminum dichotomum** *Vahl*—F.T.A. 4, 1 : 9; Chev. Bot. 398. *J. gardeniodorum* Gilg—F.T.A. 4, 1 : 8. *J. nigericum* A. Chev. A lofty climber with fragrant white flowers.
French Sudan : Ian, on the banks of the Bani R. (June) ! Sansanding (Sept.) ! Senegal ! French Guinea : Conakry and Iles de Los (Feb.) ! Sierra Leone : common ! Gold Coast : Accra and district, common ! Shai Plains (Jan.) ! Togo : Lome ! N. Nigeria : Zaria and district (Feb.) ! Bauchi Plateau, Tilde Fulani, etc., 330 ft. (Jan., May) ! S. Nigeria : Lagos Colony ! Lagos ! Ilaro ! Oloke Meji ! Exsicc.—*Heudelot* 578. *T. Vogel* 182. *Sc. Elliot* 3949 ; 4032 ; 4421 ; 5377 ; 5485 ; 5689. *Johnson* 528 ; 1066. *Rowland. Millen* 160. *Dawodu* 227. *Dalz.* 157 (Gold Coast) ; 365. *Chev.* 1082 ; 2836 ; 2837. *Warnecke* 15 ; 371. *Mildbr.* 7483.
2. **J. Dinklagei** *Gilg & Schellenb.* in Engl. Bot. Jahrb. 51 : 97. Climbing shrub with cymules of white flowers.
Liberia : White Plains, near forest (May) ! Exsicc.—*Dinklage* 2193.
3. **J. Preussii** *Engl. & Knobl.*—F.T.A. 4, 1 : 9. *J. Preussii* Gilg & Schellenberg. *J. monticola* Gilg & Schellenberg. A climbing shrub, rusty-hirsute, with flowers 1 in. long.
S. Nigeria : Oban ! Cameroons Mt. : Buea, etc. (June) ! Musake, 5,000 ft. (May) ! Also in French Cameroons. Exsicc.—*Talb.* 335. *Maitland* 39 ; 653. *Preuss* 122. *Deistel* 203.
4. **J. obtusifolium** *Baker*—F.T.A. 4, 1 : 4 ; Chev. Bot. 398. A scrambling shrub with white flowers 1½ in. long, and blue-black ellipsoid berries ½ in. long.
French Sudan : San, on rocks at Fo (June) ! Gourma and district (July) ! N. Nigeria : Lokoja (Mar.) ! Sokoto Prov., several localities (Apr., June) ! Lemme (May) ! Yola, rocks hills (Mar.) ! S. Nigeria : Yoruba country ! Niger at Kawgan ! Exsicc.—*Barter* 1338 ; 3435. *Thaw* 34. *Dalz.* 207 ; 538. *Ryan* 38 ; 67. *Lely* 157.
5. **J. pauciflorum** *Benth.*—F.T.A. 4, 1 : 6 : Chev. Bot. 398. *J. angustilobum* Gilg & Schellenberg. *G. Warneckei* Gilg. *J. Talbotii* Wernham. *J. Callianthemum* Gilg & Schellenberg. A lofty-climbing shrub with slender white flowers 1–1½ in. long.
From French Guinea to N. and S. Nigeria, fairly common ! Exsicc.—*T. Vogel* 10. *Barter* (no number). *Mann* 849. *Sc.Elliot* 5556 ; 5639. *Rowland. Farmar* 420. *Dalz.* 5. *Collenette* 16. *Lely* 251. *Dent Young* 169. *Talb.* 336. *Linder* 1155 ; 1172. *Baumann* 581. *Warnecke* 143 ; 390.
6. **J. Kerstingii** *Gilg & Schellenberg* in Engl. Bot. Jahrb. 51 : 92. A shrublet with white flowers 1½ in. long.
Gold Coast : N. Terr., Kulpawn R. flats, near Bentala (Apr.) ! Also ? locality (Apr.) ! Togo : Yendi (Apr.) ! Sokode-Basari, sandy open savannah (Feb.) ! Exsicc.—*Kersting* 121 ; 557. *Vigne* 1695. *Kitson* 667. *Pomeroy* 1229.
7. **J. mauritianum** *Bojer*—F.T.A. 4, 1 : 10. A pubescent scrambling shrub, with white flowers and black fruits.
N. Nigeria : Bauchi Plateau, Naraguta ! Throughout tropical Africa and in S. Africa. Exsicc.—*Lely* 61.
8. **J. Bakeri** *Sc. Elliot*—F.T.A. 4, 1 : 12 ; Chev. Bot. 398. A climber with broad unequal-sized leaflets and fragrant white flowers.
French Guinea : Bonhouri Village (Feb.) ! Labé (Apr.) ! Kissi, Bangadou (Feb.) ! Sierra Leone : near Berria (Mar.) ! Ivory Coast : Upper Sassandra, between Sogui and Konalé (May). Exsicc.—*Pobéguin* 899. *Sc. Elliot* 5409. *Chev.* 12318 ; 20730 ; 21697.

## 121. APOCYNACEAE

Trees, shrubs or climbers, rarely perennial herbs. Leaves opposite or verticillate, rarely alternate, simple, entire ; stipules absent. Flowers hermaphrodite, actinomorphic. Calyx often glandular inside ; lobes 5 or rarely 4, imbricate. Corolla tubular, variously shaped ; lobes contorted-imbricate, very rarely valvate. Stamens 5 or rarely 4, inserted in the tube ; filaments free or rarely united ; anthers often sagittate, free or connivent around the stigma, rarely adherent to the latter, 2-celled, opening lengthwise, connective often produced at the apex ; pollen granular ; disk usually present, annular, cupular or of separate glands. Ovary superior, 1-celled with 2 parietal placentas or 2-celled with the placentas adnate to the septa, or carpels 2 and free or connate only at the base with ventral placentas in each carpel. Style 1, split at the base or entire, thickened and stigmatose below the apex ; ovules 2 or more in each carpel. Fruit entire and indehiscent or of 2 separate carpels, baccate, drupaceous or follicular. Seeds mostly with endosperm and large straight embryo, often winged or appendaged with long silky hairs.

A well-marked family with opposite exstipulate entire leaves, contorted gamopetalous corolla without a corona, and superior often apocarpous ovary.

Leaves spirally arranged ; stem succulent, stout, unarmed ; flowers appearing before the leaves .. .. .. .. .. .. .. .. .. 1. **Adenium**
Leaves opposite or whorled :
Branchlets armed with axillary spines ; ovary syncarpous .. .. 2. **Carissa**
Branchlets without spines :
Corolla-lobes overlapping to the left (viewed from outside) :
Ovary syncarpous :
Style short, not or only slightly exceeding the calyx, mostly glabrous :
Inflorescence terminal :
Calyx with many glands on the inside .. .. .. .. 3. **Vahadenia**
Calyx without glands on the inside .. .. .. .. 4. **Landolphia**
Inflorescence axillary :
Calyx without glands inside .. .. .. .. .. 5. **Clitandra**
Calyx glandular within .. .. .. .. .. .. 6. **Cyclocotyla**
Style long, much exserted from the calyx, usually hairy .. 7. **Carpodinus**

- Ovary apocarpous or the carpels united only at the base :
  - Fruit composed of follicles :
    - Trees or shrubs :
      - Anthers included .. .. .. .. .. .. 17. **Alstonia**
      - Anthers exserted .. .. .. .. .. .. .. 8. **Pleioceras**
    - Herbs ; follicles up to 4 cm. .. .. .. .. .. 9. **Lochnera**
  - Fruit a berry or drupe :
    - Inflorescence axillary :
      - Disk 0 ; ovules 1–4 in each cell .. .. .. .. 10. **Pleiocarpa**
      - Disk annular ; ovules many .. .. .. .. .. 12. **Callichilia**
    - Inflorescence terminal :
      - Sepals free to the base or nearly so :
        - Corolla-tube up to 8 mm. long, at least 4 times as long as the lobes, ovules 2 in each cell .. .. .. .. .. .. .. 11. **Rauwolfia**
        - Corolla-tube 1 cm. long or more, not more than twice as long as the lobes, ovules numerous :
          - Disk free, fleshy and annular .. .. .. .. 12. **Callichilia**
          - Disk absent :
            - Style up to 3 mm. long ; climbing shrubs .. .. .. 13. **Gabunia**
            - Style 5 mm. or more long ; erect trees or shrubs :
              - Anthers shortly 2-lobed at the base, inserted on the upper 3rd of the corolla-tube .. .. .. .. .. .. .. 14. **Picralima**
              - Anthers sagittate ; inserted at or below the middle of the corolla-tube 15. **Conopharyngia**
      - Sepals united into a tubular or subcampanulate calyx circumscissile at the base or splitting longitudinally .. .. .. .. .. 16. **Voacanga**

- Corolla-lobes overlapping to the right ; ovary mostly apocarpous :
  - Anther-cells not sagittate :
    - Corolla-tube over 2 cm. long .. .. .. .. .. 12. **Callichilia**
    - Corolla-tube under 1·5 cm. long :
      - Stamens inserted above the middle of the corolla-tube .. 17. **Alstonia**
      - Stamens inserted near the base of the corolla-tube .. .. 18. **Holarrhena**
  - Anther-cells sagittate :
    - Corolla-limb actinomorphic :
      - Anther-cone included in the corolla-tube :
        - Ovary syncarpous .. .. .. .. .. .. 19. **Holalafia**
        - Ovary apocarpous :
          - Corolla without appendages between the lobes, which are very rarely prolonged into tails :
            - Tube of corolla 1 cm. long or less :
              - Trees ; numerous glands at the base of the sepals .. 20. **Funtumia**
              - Climbing shrubs ; 5 or no glands at the base of the sepals :
                - Corolla-mouth much constricted ; disk 0 .. .. .. 21. **Alafia**
                - Corolla-mouth wide ; disk cupular :
                  - Anther-tails acute, straight or nearly so ; corolla funnel-shaped, campanulate or urceolate, mostly with transverse scales or swellings above the insertion of the stamens .. .. .. .. .. 22. **Baissea**
                  - Anther-tails obtuse, strongly recurved ; corolla more or less salver shaped ; no transverse scales or swellings above the insertion of the stamens :
                    - Corolla-mouth with 5 ligulate scales ; anther-tips acute, glabrous ; 5 minute glands at the base of the calyx .. .. 23. **Oncinotis**
                    - Corolla-mouth without scales ; anther-tips bearing a minutely plumose mucro ; calyx eglandular .. .. .. .. 24. **Motandra**
            - Tube of corolla 2 cm. or more long .. .. .. .. 12. **Callichilia**
          - Corolla with paired appendages between the usually long-tailed lobes 25. **Strophanthus**
      - Anther-cone exserted from the corolla-tube .. .. .. 26. **Malouetia**
    - Corolla-limb zygomorphic ; anther-cone exserted .. .. 27. **Isonema**

### 1. **ADENIUM** Roem. & Schult.—F.T.A. 4, 1 : 226.

Young branches softly tomentellous ; leaves spirally arranged, sessile, oblanceolate, rounded at the apex and mucronate, gradually narrowed to the base, 7–12 cm. long, 1–3·5 cm. broad, glabrous, with faint lateral nerves ; flowers in short subsessile cymes ; pedicels and calyx tomentellous ; calyx-lobes narrowly lanceolate, very acute, 1 cm. long ; corolla 5·5 cm. long, tube cylindric and narrow in the lower half, wide above, softly pubescent outside .. .. .. .. *Honghel*

**A. Honghel** *A.DC.*—F.T.A. 4, 1 : 229 ; Chev. Bot. 426. A shrub with stout smooth stem and branches half-succulent, leafless when in flower ; flowers pink or red, more or less Oleander-like, 1½–2 in. long.
Chiefly in the drier regions from Mauritania and Senegal to N. Nigeria, often planted, and extending to E. Sudan. Exsicc.—*Roger* 133. *Leprieur.* *Perrottet.* *Barter* 711. *Dalz.* 97 ; 430. (See Appendix).

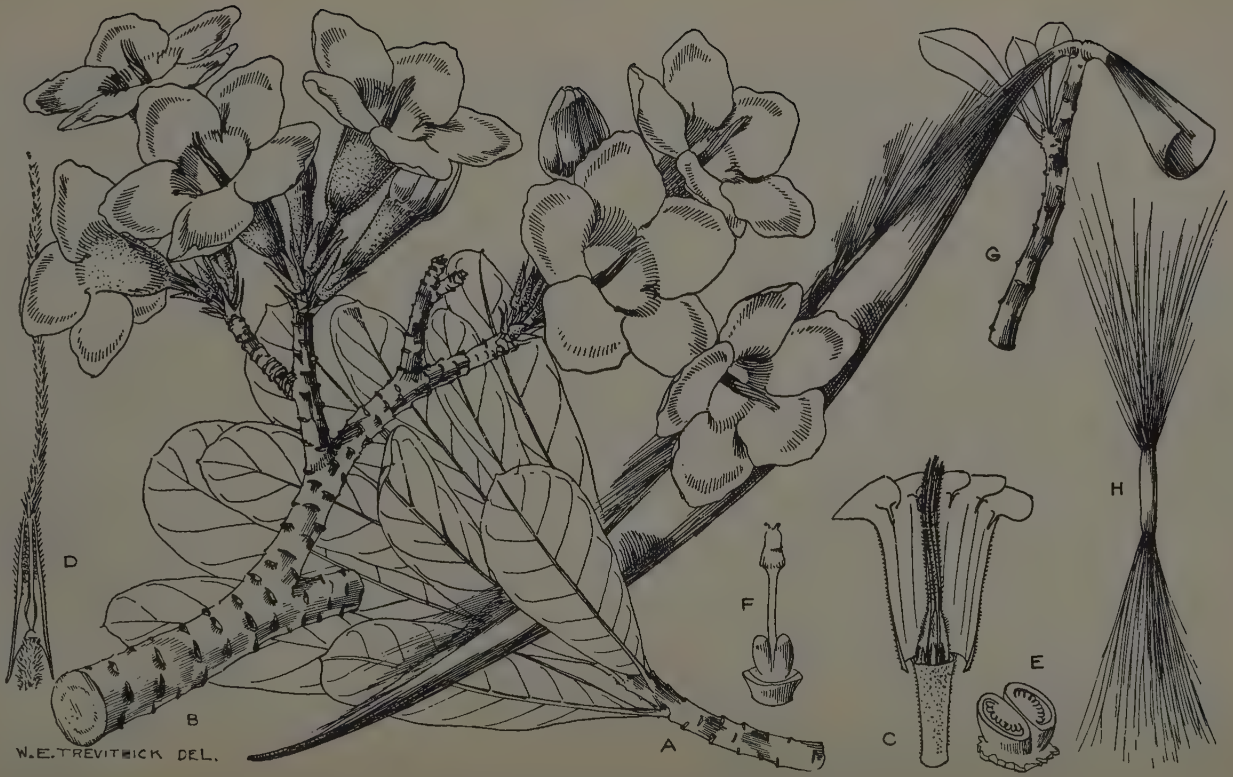
A
B
C
D
E
F
G
H
W.E. TREVITHICK DEL.

FIG. 189.—ADENIUM HONGHEL *A. DC.* (APOCYNACEAE).

A, leafy shoot. B, flowering shoot. C, corolla laid open showing staminal cone. D, stamen. E, cross-section of ovary. F, pistil. G, one carpel in fruit. H, seed.

### 2. **CARISSA** Linn.—F.T.A. 4, 1 : 88.

Branchlets glabrous or thinly and softly pubescent when young, armed with axillary spines ; leaves ovate, acute, rounded or broadly cuneate at the base, 4–8 cm. long, 2·5–5 cm. broad, glabrous or thinly pubescent on the midrib below, with 3–5 pairs of faint lateral nerves ; flowers in shortly pedunculate cymes ; peduncle and calyx glabrous or softly pubescent ; calyx-lobes 3·5 mm. long, long-acuminate ; corolla-tube glabrous, 2 cm. long ; lobes 6–8 mm. long, thinly pubescent towards the base ; fruit about 1 cm. diam., glabrous .. .. .. .. .. .. *edulis*

**C. edulis** *Vahl*—F.T.A. 4, 1 : 89 ; Chev. Bot. 411 ; Holl. 3 : 438. A much-branched shrub with straight spines and umbelliform cymes of white and wine-red flowers.
Widely distributed in tropical Africa, and in Socotra and Arabia. (See Appendix).

### 3. **VAHADENIA** Stapf—F.T.A. 4, 1 : 29.

Climber up to 100 ft. ; branches glabrous ; leaves obovate-elliptic, shortly and very bluntly pointed, mucronate, narrowed to an obtuse base, 7–18 cm. long, 3–7 cm. broad, glabrous, with about 5 pairs of lateral nerves, finely reticulate between the nerves ; petioles up to 1 cm. long, connected at the base by a stipule-like rim ; inflorescence terminal, a few-flowered panicle, sometimes some of the lateral branchlets tendriliform ; calyx 6 mm. long, leathery, lobes very broadly oblong ; corolla 4 cm. long ; lobes about as long as the tube, oblanceolate, woolly towards the base ; fruit globose, smooth .. .. .. .. .. .. .. .. *Caillei*

**V. Caillei** *Stapf MS. Landolphia Caillei* A. Chev. in Bull. Soc. Bot. Fr. 58, Mém. 8d : 181. *V. Talbotii* Wernham. A lofty woody climber with tendrils and climbing also by tendriliform branches of the inflorescence ; flowers white with red base, turning yellow, the corolla falling off after opening.
French Guinea : Kouria and neighbourhood (Oct.–Dec.) ! Bilima ; Socourala. Sierra Leone : ? locality ! Ivory Coast : Bingerville and district ; Guidéko to the Zozro ; Azaguié. S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Lane-Poole* 448. *Caille* in *Herb. Chev.* 14895 ; 22287. *Talb.* 1634.

### 4. **LANDOLPHIA** Beauv.—F.T.A. 4, 1 : 30.

Flowers clustered in more or less short often rather dense cymes, either terminal or terminating short leafy branchlets (never in leafless panicles and inflorescence never tendriliform) :

Branchlets more or less densely pilose or villous with rather long spreading hairs :

Sepals pubescent on the outside ; leaves elliptic-oblong or oblong, acuminate, rounded or slightly cordate at the base, 6–11 cm. long, hirsute on both sides especially on the nerves below ; corolla-tube 1·5–2 cm. long, lobes 2 cm. long 1. *bracteata*

Sepals pubescent only on the margin ; leaves oblong, broadly and obtusely acuminate, subcuneate at the base, 4–8 cm. long, pubescent on the midrib on both surfaces ; corolla-tube 3·5 mm. long, lobes 3 mm. long .. .. .. .. 2. *Talbotii*

Branchlets glabrous or very shortly pubescent or puberulous :

Corolla-lobes 1·5–2 cm. long :

Ovary glabrous :

Corolla-tube scurfy-pubescent outside, about 1·3 cm. long, lobes about 2 cm. long, glabrous ; leaves oblong, abruptly acuminate, obtuse at the base, 7–10 cm. long, up to 4·5 cm. broad, glabrous .. .. .. .. 3. *senegalensis*

Corolla-tube glabrous outside .. .. .. 3. *senegalensis* var. *glabriflora*

Ovary tomentose :

Corolla-tube rather densely puberulous-tomentellous outside, about 2 cm. long, lobes as long or a little longer ; leaves variable, more or less elliptic, shortly acuminate, rounded at the base, up to 18 cm. long and 8 cm. broad ; lateral nerves 8–10 pairs.. .. .. .. .. .. .. .. 4. *florida*

Corolla-tube nearly glabrous outside, about 1·5 cm. long, lobes nearly as long ; leaves oblong-elliptic, abruptly acuminate, rounded to subacute at the base, 8–18 cm. long, up to 7 cm. broad ; lateral nerves 8–10 pairs 5. *Thompsonii*

Corolla-lobes up to 1 cm. long :

Leaves (especially on the midrib) softly pubescent below, oblong or elliptic, obtusely acuminate or subacute, up to 7 cm. long and 3 cm. broad ; lateral nerves 7–10 pairs ; corolla-tube 6–7 mm. long, finely pubescent or tomentose outside 6. *Heudelotii*

Leaves glabrous below (when mature), oblong to elliptic or lanceolate, acuminate, subacute at the base, 7–14 cm. long, up to 6 cm. broad ; lateral nerves 10–15 pairs ; corolla-tube 6 mm. long, tomentose or densely pubescent outside 7. *owariensis*

Flowers in branched panicles, the branches often tendriliform :

Sepals glabrous or ciliate only on the margin with longish hairs :

Nodes with long setiform glands resembling divided stipules ; branches densely pilose ; leaves oblong-elliptic, cuspidate-acuminate, cordate at the base, up to 15 cm. long and 7 cm. broad, hispid on the nerves below ; corolla-tube 1·5 cm. long, lobes nearly as long .. .. .. .. .. .. 8. *stipulosa*

Nodes without setiform glands ; leaves obovate-oblong, abruptly acuminate, slightly cordate at the base, 15–18 cm. long, about 8 cm. broad, at first tomentose at length nearly glabrous; lateral nerves about 6 pairs; corolla-tube over 2 cm. long, lobes 8 mm. long .. .. .. .. .. .. .. .. 9. *leonensis*

Sepals pubescent or tomentellous all over the outside:

Leaves shortly cordate at the base, puberulous with stellate hairs below, 20–35 cm. long, 10–18 cm. broad; tertiary nerves prominent and subparallel; lateral nerves 7–10 pairs; corolla-tube 1·4 cm. long, lobes 1·2 cm. long, long-ciliate 10. *ochracea*

Leaves at most rounded at the base, glabrous or nearly so when mature; tertiary nerves more or less reticulate:

Corolla-tube pubescent only along 5 longitudinal lines, 2–2·5 cm. long, lobes 1–1·4 cm. long, ciliate; leaves oblong to oblong-lanceolate, obtusely acuminate, 6–10 cm. long, 2·5–5 cm. broad; lateral nerves 12–15 pairs .. .. 11. *scandens*

Corolla-tube pubescent all over the outside, 1–1·4 cm. long:

Midrib of the leaves glabrous below; blade ovate to ovate-oblong, acutely acuminate, 7–15 cm. long, up to 7 cm. broad; lateral nerves 8–11 pairs 12. *robusta*

Midrib of the leaves finely pubescent below; blade oblong or ovate, shortly and acutely acuminate, 6–10 cm. long, 3–4 cm. broad; lateral nerves about 12 pairs 13. *amoena*

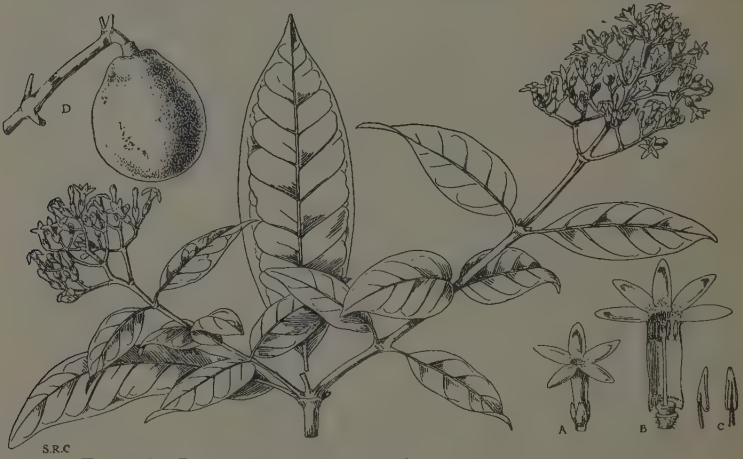

FIG. 190.—LANDOLPHIA OWARIENSIS *P. de Beauv.* (APOCYNACEAE).
A, flower. B, same with corolla opened. C, anthers. D, fruit.

1. **Landolphia bracteata** *Dewèvre*—F.T.A. 4, 1 : 41; Chev. Bot. 403. A woody climber with branched tendrils, rusty-hirsute, with white flowers.
Sierra Leone: Matotoka (July)! Ivory Coast: Abidjean, Dabou. Gold Coast: Aburi Hills! Aquapim! Dahomey: Allada (Mar.)! Sakété (Jan.); Koussi (Feb.). S. Nigeria: Asaba! Idanre! Eket! Calabar (Feb.)! Exsicc.—*Mann* 2242. *Brown* 391. *N. W. Thomas* 1236. *Unwin* 12; 16. *Foster* 200. *Talb.* 3055; 3126. *Poisson.* (See Appendix).

2. **L. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 60. A climbing shrub with rusty-pubescent branchlets.
S. Nigeria: Oban! Exsicc.—*Talb.* 1038.

3. **L. senegalensis** *Kotschy & Peyr.*—F.T.A. 4, 1 : 36; Holl. 3 : 433; Chev. Bot. 408. A strong woody climber, glabrous except the inflorescence.
French Sudan and Senegal: various localities! Gambia! French Guinea: Kouroussa (Feb.); Kankan (Mar.); Kollangui (Mar.). Gold Coast: ? locality! N. Terr. Lorha (Mar.)! Kulmasa to Jagalo (Sept.)! Togo: Lome! Exsicc.—*Heudelot* 29. *Roger.* *Skues.* *Evans* 2. *McLeod* 832. *Kitson* 668. *Warnecke* 421. (See Appendix).

var. **glabriflora** *Hua*—F.T.A. 4, 1 : 37. Similar but with glabrous inflorescence.
Gambia! French Guinea: Kouroussa (Apr.)! Siguiri! Sierra Leone: Farana (Mar.)! Exsicc.—*Sc. Elliot* 5345. *Dawe* 54. *Pobéguin* 39; 659.

4. **L. florida** *Benth.*—F.T.A. 4, 1 : 38; Stapf 616; Holl. 3 : 428; Chev. Bot. 404. A strong woody climber with red-purplish stems and jasmine-like white flowers yellow in the throat, and edible yellow fruit.
Throughout the area and in the greater part of tropical Africa! Exsicc.—*T. Vogel* 101. *Barter* 914. *Sc. Elliot* 4896; 5109. *Rowland.* *Johnson* 151; 749. *Dudgeon* 21; 64. (See Appendix).

5. **L. Thompsonii** *A. Chev.* in Bull. Soc. Bot. Fr. 58 : Mém. 8, d, 182; Holl. 3 : 434; Chev. Bot. 409. Like the last but with flowers rather smaller and nearly glabrous.
Ivory Coast: Baoulé-Nord, Nzi (Aug.)! Middle Comoé, Yabouakrou. Dahomey: several localities! S. Nigeria: Ajilite! Lagos Colony! Ibadan (Dec.)! Benin! Asaba! Exsicc.—*Millen* 166. *Punch* 45. Foster 28. *Thompson* 5; 12. (See Appendix).

6. **L. Heudelotii** *A.DC.*—F.T.A. 4, 1 : 53; Chev. Bot. 405. *L. Heudelotii* var. *Djenge* Stapf partly. A woody climber or sometimes more or less erect, with softly pubescent branches and corymbs of white flowers about ½ in. long.

Common from Senegal to Sierra Leone, and also in N. Territories of Gold Coast! Exsicc.—*Heudelot* 602. *Michelin.* *Sc. Elliot* 4544; 4630; 4650; 4675; 4773; 5450. *Farmar* 121; 163. *Dudgeon* (no number). *Dawe* 8; 29. *Kitson* 785. (See Appendix).

7. **L. owariensis** *Beauv.*—F.T.A. 4, 1: 49; Stapf 616, t. 250; Holl. 3: 429; Chev. Bot. 406. *L. Heudelotii* var. *Djenge* Stapf, partly. *L. Stapfiana* Wernham. *L. Pierrei* and var. *glabra* A. Chev. A large woody climber with stems sometimes 3–4 in. in diam., or a shrub or small tree, with brown-purple branches and rusty-brown inflorescence of rather small fragrant white flowers turning yellow-brown.

From French Guinea to Cameroons, up to 9° N. lat. in N. Nigeria; extending to Angola, Congo Basin and southern part of the E. Sudan. Exsicc.—*Barter* 1773; 1810. *Mann* 2311. *Sc. Elliot* 3878; 4754 *Smythe* 21; 75; 82; 226. *Johnson* 282; 524; 811. *Brown* 354. *Sim* 6; 15; 17. *Whyte* 12. *Moloney.* *Millen* 168. *Thompson* 12; 13; 14. *Unwin* 2; 6; 7; 9. *Foster* 197. *Elliot* 99; 101; 102; 104. *Talb.* 1617. *Poisson.* *Chev.* 16733; 16805; 19044; 19546. (See Appendix).

8. **L. stipulosa** *S. Moore* in Cat. Talb. Nig. Pl. 59. A hirsute woody climber.

S. Nigeria: Oban! Exsicc.—*Talb.* 1296.

9. **L. leonensis** *Stapf*—F.T.A. 4, 1: 36. A woody climber rather bristly-hairy and with the branches of the inflorescence acting as tendrils.

Sierra Leone: ? locality (May)! Heddle's Farm (May)! Liberia: Dukwia R. (May)! Exsicc.—*Barter* (no number). *Lane-Poole* 268. *Smythe* 42. *G. P. Cooper* 423. (See Appendix).

10. **L. ochracea** *K. Schum.*—F.T.A. 4, 1: 40. A climbing shrub with broad leaves and tendril-inflorescences, the branches, etc., covered with pale cinnamon-coloured pubescence.

S. Nigeria: Oban! Also in Cameroons. Exsicc.—*Talb.* 292.

11. **L. scandens** *Didr.*—F.T.A. 4, 1: 44; Holl. 3: 433; Chev. Bot. 408. A woody climber with tendril-inflorescences and white flowers about 1½ in. long, the branches brown-purple, rusty-pubescent when young.

Ivory Coast: Guidéko; Bouroukrou; Danané. Gold Coast: Krobo plains (Dec.)! ? locality! Togo: Lome! Dahomey: ? locality! Adjara; Porto-Novo; Whydah. S. Nigeria: Lagos, Ikoyi! Ilaro Road (May)! Asaba! Exsicc.—*Moloney.* *Millen* 105. *Johnson* 494. *Farmar* 398.

12. **L. robusta** *Stapf*—F.T.A. 4, 1: 43. A climbing shrub with tendril-inflorescences and dark brown-purple branches very finely tomentose.

S. Nigeria: Eket! Also in Spanish Guinea. Exsicc.—*Talb.* 3119.

13. **L. amoena** *Hua*—F.T.A. 4, 1: 46; Chev. Bot. 402. *L. ferruginea* Stapf—F.T.A. 4, 1: 46. A scandent shrub, brown-pubescent when young, with tendril-inflorescences and fragrant white flowers.

French Sudan: Nono; Kangala to Kindali; Komana. French Guinea: common! Ivory Coast: Upper Sassandra, Toura country; Mankono. Gold Coast: Akwapim Hills (Nov.)! N. Terr., Prang (Jan.)! Dahomey: Atacora Mts., 1,200–1,800 ft. (June)! Djougou. N. Nigeria: Bassa! Lokoja (Nov.)! Karahe (Feb.)! Bauchi Plateau, Naraguta! Vom, 3,000–4,500 ft.! S. Nigeria: Lagos Colony, Isahin! ? localities! Exsicc.—*Paroisse* 24. *Rowland* 20. *Johnson* 782. *Elliott* 103. *Farmar* 264. *Unwin* 2, 8, 9. (See Appendix).

## 5. **CLITANDRA** Benth.—F.T.A. 4, 1: 60.

Leaves not or hardly acuminate, at most very shortly and broadly pointed, oblong or elliptic, broadly cuneate at the base, 6–12 cm. long and up to 5 cm. broad, with about 7–8 pairs of prominent lateral nerves with less conspicuous intermediate ones; flowers axillary, clustered, subsessile; calyx-lobes ciliate and slightly pubescent; corolla-tube 3 mm. long, lobes 2 mm. long; fruit globose, about 4 cm. diam. 1. *togolana*

Leaves distinctly acuminate:

Leaves cordate at the narrowed base, oblanceolate, long-acuminate, up to 15 cm. long, 4–5 cm. broad, with 7–9 pairs of looped lateral nerves; flowers solitary, subsessile; calyx-lobes triangular-ovate, hardly ciliate; corolla 1 cm. long; fruit ovoid, pointed, about 8 cm. long .. .. .. .. .. .. 2. *membranacea*

Leaves not cordate at the base:

Axis and branches of inflorescence softly and rather densely pubescent:

Corolla-lobes much longer than the tube; leaves oblong, bluntly acuminate, rounded at the base, up to 9 cm. long and 4·5 cm. broad, with about 12 pairs of lateral nerves with fainter ones between; corolla about 1·2 cm. long; calyx-lobes triangular, ciliate; fruit globose-ellipsoid, hardly 2·5 cm. long 3. *laxiflora*

Corolla-lobes about as long as the tube; leaves oblong-elliptic, narrowly acuminate, shortly cuneate at the base, up to 14 cm. long, 3–7 cm. broad, with fairly numerous but rather distant lateral nerves; corolla about 8 mm. long; calyx-lobes puberulous; fruit ellipsoid, 7 cm. long .. .. .. .. .. .. 4. *cymulosa*

Axis and branches of inflorescence glabrous or at most slightly pubescent on the angles:

Lateral nerves few and much more conspicuous than the often reticulate ones between, about 6–10 pairs:

Bracts ciliate:

Leaves very shortly and bluntly acuminate, elliptic, subacute at the base, 6–8 cm. long, 3–5 cm. broad; calyx-lobes very ciliate; corolla 1 cm. long, the tube about as long as the lobes .. .. .. .. .. 5. *Stapfiana*

Leaves narrowly acuminate, oblong, shortly cuneate at the base, 10–18 cm. long, 4–6 cm. broad; calyx-lobes very shortly ciliate; corolla 1·4 cm. long, the tube very short .. .. .. .. .. .. .. 6. *leptantha*

Bracts not ciliate:

Leaves broadly acuminate, the lateral nerves forming a distinct intramarginal nerve, 5–10 cm. long, 3–5 cm. broad, shining, obovate-elliptic; corolla 1 cm. long, the tube very short .. .. .. .. .. .. 7. *nitida*

Leaves narrowly acuminate, the lateral nerves much-branched some distance from the margin:

Inflorescence shortly cymose; leaves 6–9 cm. long, 3–4 cm. broad, oblong or elliptic; corolla 8 mm. long, the lobes short .. .. 8. *parvifolia*

Inflorescence sessile ; leaves up to 15 cm. long, and 7 cm. broad, oblong ; corolla 1·2 cm. long, the lobes as long as the tube .. .. 9. *robustior*

Lateral nerves numerous, close, parallel :

Flowers sessile, few ; leaves broadly elliptic, shortly acuminate, very shortly cuneate at the base, 8–10 cm. long, 4–5 cm. broad ; corolla 10–12 mm. long 10. *Barteri*

Flowers distinctly pedicellate :

Corolla 2–2·5 cm. long :

Leaves more or less rounded at the base, broadly elliptic, 9–12 cm. long, 4–6 cm. broad, shortly and broadly acuminate .. .. .. 11. *visciflua*

Leaves narrowed to the base, narrowly oblong-oblanceolate, 9–15 cm. long, 3–5 cm. broad, rather long-acuminate .. .. .. 12. *longituba*

Corolla up to 1·5 cm. long :

Bracts ovate :

Bracts pubescent outside ; corolla 1·5 cm. long ; leaves elongate to oblong, long-acuminate, 8–12 cm. long, 3–4 cm. broad ; bracts and calyx very shortly ciliate .. .. .. .. .. .. .. .. .. 13. *Staudtii*

Bracts glabrous outside :

Lateral nerves 30 pairs or more ; blade oblong, long- and subspathulate-acuminate, 8–12 cm. long, 3–5 cm. broad ; bracts and calyx prominently ciliate.. .. .. .. .. .. .. .. .. 14. *cirrhosa*

Lateral nerves much fewer :

Lateral nerves very prominent ; blade mostly rather narrowed to the base 7. *nitida*

Lateral nerves slightly prominent ; blade broadly oblong-elliptic, abruptly and very shortly acuminate, rounded at the base, 7–8 cm. long, 3·5–5·5 cm. broad ; cymes subsessile ; corolla about 1·5 cm. long 15. *ivorensis*

Bracts subulate ; corolla up to 7 mm. long ; leaves oblong, subspathulate-acuminate, 6–10 cm. long, 2·5–4 cm. broad ; bracts and calyx slightly ciliate 16. *Mannii*

1. **Clitandra togolana** *Stapf*—F.T.A. 4, 1 : 64 ; Chev. Bot. 402. *C. alba* Stapf. A climbing shrub with slender spiral tendrils and white fragrant flowers turning yellow.

Ivory Coast : Sassandra port, along the beach (May) ! Grand Bassam. Gold Coast : Okroase (May) ! Togo : Lome, in the bush (fl. and fr. Jan.) ! S. Nigeria : Ibadan Forest Reserve (May) ! Exsicc.—*Johnson* 753. *Foster* 42. *Warnecke* 46 ; 331. *A. Chev.* 17938. (See Appendix).

2. **C. membranacea** *Stapf* in Johnston Liberia 2 : 618, t. 252 ; F.T.A. 4, 1 : 597 ; Chev. Bot. 401. A glabrous slender climber with long fine tendrils, solitary greenish-white flowers and conical fruit with 5 ridges.

Liberia : Greenville, Sino basin ! Botamba town ! Ivory Coast : Grabo, Mt. Copé (July) ! Bingerville, Bouroukrou, Kéeta village, Abidjean, etc. Exsicc.—*Sim* 1 ; 30. *Whyte* 6 ; 14.

3. **C. laxiflora** *Hallier f.*—F.T.A. 4, 1 : 69. *Carpodinus incerta* K. Schum. A glabrous climber.

French Guinea : Futa Jallon ! Sierra Leone : ? locality ! Scarcies R., Buyabuya (fr. Feb.) ! Togo : Misahöhe (Apr.) ! Katschenki (May) ! Exsicc.—*Afzelius*. *Sc. Elliot* 4547. *Baumann* 514. *Kling* 7.

4. **C. cymulosa** *Benth.*—F.T.A. 4, 1 : 65 ; Chev. Bot. 400 ; Holl. 3 : 435 (as *C. elastica*). *C. elastica* A. Chev. *C. orientalis* A. Chev. Bot. 401, not of K. Schum. ?[1] A woody climber with lenticellate bark.

French Guinea : Kissi district (fl. and fr. Feb.) ! Between Moussadougou and Lola. Sierra Leone : Freetown ! Jepihun (Dec.) ! Kenema ! Ivory Coast : several localities ! Gold Coast : ? locality ! Dahomey : Sakété ! N. Nigeria : Bassa (fr. Aug.) ! S. Nigeria : Sapoba ! Degema ! Calabar ! Exsicc.—*Don. Smythe* 230. *Talb.* 3657. *N. W. Thomas* 7893. *Elliott* 98. *Thompson* 15. *A. Chev.* 13625 ; 15181 ; 19524 ; 19841 ; 20726 ; 20728 ; 22866. (See Appendix).

5. **C. Stapfiana** *A. Chev.* in Bull. Soc. Bot. Fr. 55, Mém. 8b : 43. A glabrous climber ; known only from a specimen cultivated in the Botanic Garden, Trinidad, supposed to be of West Tropical African origin.

6. **C. leptantha** *Hallier f.*—F.T.A. 4, 1 : 70. *C. micrantha* A. Chev. A woody climber with tendrils.

Ivory Coast : Soubiré to Namouéfio S. Nigeria : Oban ! Eket ! Extends to Gabon. Exsicc.—*Talb.* 1526 ; 2047 ; 3190. *Chev.* 17691.

7. **C. nitida** *Stapf* in Johnston Liberia 2 : 618, t. 251 ; F.T.A. 4, 1 : 595. A glabrous climber with long tendrils, shining coriaceous leaves, and warty fruits.

Liberia : Sino Basin, Greenville ! Kaka and Batomba (Mar., fr. Dec.) ! Dukwia R. (fr. Oct.–Nov.) ! Exsicc.—*Whyte* 1 ; 11. *Sim* 24. *G. P. Cooper* 43. (See Appendix).

8. **C. parvifolia** *Stapf*—F.T.A. 4, 1:63. *C. Talbotii* Wernham. A glabrous climber.

S. Nigeria : Oban ! Also in Gabon. Exsicc.—*Talb.* 1039.

9. **C. robustior** *K. Schum.*—F.T.A. 4, 1 : 71. A strongly climbing glabrous shrub.

S. Nigeria : near Barombi (not seen). Exsicc.—*Preuss* 390. Extends to Congo. (See Appendix).

10. **C. Barteri** *Stapf*—F.T.A. 4, 1 : 66. A climber with tendrils, and brown-purple branches.

Liberia : Sino Basin ! Gold Coast : Dome (fr. May) ! ? locality ! S. Nigeria : Epe ! Sapoba ! Asaba, Anwai R. ! Exsicc.—*Barter* 3310. *Whyte* 4. *Thompson* 76. *Unwin* 15 ; 21. (See Appendix).

11. **C. visciflua** *K. Schum.*—F.T.A. 4, 1 : 66 ; Holl. 3 : 436. A glabrous climber with tendrils.

S. Nigeria : Benin ! Also in Cameroons and Gabon. Exsicc.—*Unwin* 51. (See Appendix).

12. **C. longituba** *Wernham* in Cat. Talb. Nig. Pl. 60. A glabrous climber with tendrils and twisted petioles.

S. Nigeria : Oban ! Eket ! Victoria ! Exsicc.—*Talb.* 1577. *Maitland* 405.

13. **C. Staudtii** *Stapf*—F.T.A. 4, 1 : 67. A glabrous woody climber.

S. Nigeria : Johann-Albrechtshöhe (Feb.) ! Exsicc.—*Staudt* 860.

14. **C. cirrhosa** *Radlk.*—F.T.A. 4, 1 : 67 ; Holl. 3 : 435. A climber with tendrils and brown-purple branches.

S. Nigeria : Oban ! Extending to Gabon. Exsicc.—*Talb.* 1351 ; 1353 ; 1537. (See Appendix).

15. **C. ivorensis** *A. Chev.* Bot. 401, partly, name only.

Ivory Coast : Abidjean and vicinity ! Exsicc.—*Chev.* 15183 ; 15616.

16. **C. Mannii** *Stapf* —F.T.A. 4, 1 : 69 ; Chev. Bot. 401. A strong climber with tendrils, the young branches brown-purple.

Sierra Leone : Bagroo R. (Apr.) ! Hierakohun ! Niepihan. Ivory Coast : several localities ! Also in Cameroons and Gabon. Exsicc.—*Barter* 848. *Smythe* 79. *Dudgeon.* (See Appendix).

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[1] We have failed to find any tangible difference between *C. cymulosa* Benth. of West Africa and *C. orientalis* K. Schum. from Uganda. Both species are reputed as rubber yielding.

*Imperfectly known species.*

**C. laurifolia** *A. Chev.* Bot. 401, name only. A woody climber.
Ivory Coast: Cavally Basin, Tépo country, Grabo ! Lower Cavally, Prolo ! Exsicc.—*Chev.* 19739 ; 19856. (See Appendix).

## 6. **CYCLOCOTYLA** Stapf in Kew Bull. 1908 : 259.

A climbing shrub ; leaves opposite, elliptic or oblong, shortly acuminate, acute at the base, about 8–10 cm. long and 4 cm. broad, with numerous spreading lateral nerves ; petiole 1–1·3 cm. long ; cymes axillary, few-flowered ; peduncle 2 cm. long ; pedicels 5 mm. long ; calyx 3·5 mm. long, lobed to the middle ; corolla-tube 8 mm. long, lobes 6 mm. long ; anthers inserted about 2 mm. above the base of the corolla-tube ; style very short .. .. .. .. .. .. .. .. *oligosperma*

**C. oligosperma** *Wernham* in Journ. Bot. 1914 : 28. Corolla cream, with a white limb and primrose centre.
S. Nigeria : Kwa Ibo River ! Exsicc.—*Talb.* 3052.

## 7. **CARPODINUS** R.Br.—F.T.A. 4, 1 : 72.

- Corolla-tube densely and shortly pubescent outside :
  - Flowers solitary ; calyx-lobes broadly ovate and shortly pubescent ; corolla about 3 cm. long, lobed to the middle ; leaves oblong, rather gradually acuminate, acute at the base, 12–20 cm. long, 4–6 cm. broad, pubescent on the midrib below ; lateral nerves about 8 pairs, very prominent below .. .. .. .. 1. *uniflora*
  - Flowers clustered :
    - Branchlets with very short indumentum ; leaves cordate at the base, elliptic, obtuse or very rarely slightly acuminate at the apex, 5–10 cm. long, 3–6 cm. broad, pubescent on the nerves, the latter about 4 or 5 pairs, looped and prominent below ; corolla about 2·5 cm. long, lobed for about ⅓ its length .. 2. *Barteri*
    - Branchlets with long indumentum ; leaves not or slightly cordate at the base, oblong-elliptic, shortly acuminate, 8–20 cm. long, 3–8 cm. broad, pilose on the 6–8 pairs of nerves below ; calyx tomentose ; corolla small, about 8 mm. long 3. *hirsuta*
    - Branchlets glabrous ; leaves obliquely subtruncate at the base, oblong-elliptic, caudate-acuminate, 10–18 cm. long, 4–6 cm. broad, with 10–12 pairs of slender nerves markedly looped within the margin ; corolla 1·5 cm. long 4. *subrepanda*
- Corolla-tube glabrous or very slightly puberulous :
  - Leaves cordate at the base :
    - Leaves up to 12 cm. long and 5 cm. broad, elliptic, acuminate, with 4–6 pairs of lateral nerves ; corolla 1·8 cm. long ; fruit ellipsoid, 6–10 cm. long 5. *oocarpa*
    - Leaves over 15 cm. long and 8–10 cm. broad, pilose on the nerves below when young, with 5–6 pairs of lateral nerves very prominent below ; young branchlets densely pilose .. .. .. .. .. .. .. .. 6. *macrophylla*
  - Leaves not cordate at the base or at most very slightly so :
    - Leaves densely puberulous all over the lower surface, elliptic or obovate, 10–16 cm. long, 5–9 cm. broad, with about 8 pairs of lateral nerves prominent below ; inflorescence subsessile, shortly tomentellous ; corolla about 2 cm. long 7. *rufinervis*
    - Leaves glabrous or pubescent only on the nerves :
      - Inflorescence a stalked cyme :
        - Leaves up to 10 cm. long and 3·5 cm. broad, oblong-elliptic, broadly acuminate, shortly cuneate at the base, with 9–11 pairs of very slender parallel nerves ; pedicels up to 7 mm. long ; calyx-lobes ciliate ; corolla 4 cm. long 8. *macrantha*
        - Leaves about 15 cm. long or more, about 6–8 cm. broad, oblong, broadly and rather gradually-acuminate, very shortly cuneate at the base, 10–18 cm. long, 5–7·5 cm. broad, with 10 or more pairs of slender lateral nerves ; corolla about 3 cm. long, quite glabrous outside .. .. .. .. .. .. 9. *landolphioides*
      - Inflorescence a sessile cluster :
        - Branchlets rather densely pubescent or tomentose ; lateral nerves of the leaves branched and looped well within the margin ; leaves oblong or oblong-ovate, obtuse or subacute or slightly acuminate, rounded at the base, 7–11 cm. long, 3–5 cm. broad, pubescent on the nerves below ; corolla about 1·4 cm. long 10. *dulcis*
        - Branchlets glabrous or very nearly so :
          - Leaves oblong-elliptic, broadly acuminate and sometimes emarginate, 7–11 cm. long ; 4·5–5·5 cm. broad ; corolla 4 cm. long, the slender tube longer than the lobes .. .. .. .. .. .. .. .. 11. *oxyanthoides*
          - Leaves narrowly oblong-elliptic, gradually acuminate, rounded at the base, 7–10 cm. long, 2–4 cm. broad, glabrous ; bracts and calyx pubescent ; corolla 4·5 cm. long, glabrous outside, the lobes equal to the tube 12. *Baumannii*
          - Leaves broadly elliptic, caudate-acuminate, rounded at the base, about 10 cm. long and 5·5 cm. broad, glabrous ; lateral nerves about 10 pairs ; corolla 3·5 cm. long, glabrous, lobes ½ as long as the tube .. .. 13. *Talbotii*
          - Leaves oblong-obovate, abruptly acuminate, slightly narrowed at the base, 10–15 cm. long, 5–6 cm. broad, with numerous parallel lateral nerves ; corolla 3 cm. long, lobed nearly to the middle .. .. .. .. 14. *violacea*

1. **Carpodinus uniflora** *Stapf*—F.T.A. 4, 1 : 75. A climber with twisted petioles.
S. Nigeria : Oban ! Extends to Gabon. Exsicc.—*Talb.* 298 ; 1480. (See Appendix).

2. **C. Barteri** *Stapf*—F.T.A. 4, 1 : 77 ; Holl. 3 : 436 ; Chev. Bot. 409. A climber with tendrils and usually bluish flowers.
Ivory Coast : several localities. Togo : Jego R..! Dahomey : near Porto Novo (Jan.). S. Nigeria : various localities ! Exsicc.—*Barter* 2138. *Mann* 2261. *Moloney* 11. *Rowland*. *Millen* 155 ; 169. *Punch* 43. *Kling* 51. (See Appendix).

3. **C. hirsuta** *Hua ex A. Chev.*—F.T.A. 4, 1 : 77 ; Holl. 3 : 437 ; Chev. Bot. 410 ; Stapf 620. *C. nigerina* A. Chev. A robust climbing shrub with tendrils and coarsely hairy branches, the flowers white or bluish.
From Casamance and French Guinea to N. and S. Nigeria ! Exsicc.—*Horton*. *Moloney*. *Higgins* 19. *Elliott* 96 ; 208. *Smythe* 43. *Lecerf*. *Chev.* 4278 ; 16386 ; 19006 ; 20588. *Cort Devl. Synd.* spec. B. (See Appendix).

4. **C. subrepanda** *K. Schum.*—F.T.A. 4, 1 : 81. A climber with tendrils.
S. Nigeria : Cross R. ! Cameroons Mt., Mukonje ! Extends to Gabon. Exsicc.—*McLeod*. *Preuss* 187. (See Appendix).

5. **C. oocarpa** *Stapf*—F.T.A. 4, 1 : 598 ; Stapf 620, t. 253. A climber with tendrils.
Liberia : Monrovia ! Murphy Town ! Botamba Town ! Sino Basin ! Greenville ! Exsicc.—*Whyte* 3 ; 9. *Sim* 27.

6. **C. macrophylla** *A. Chev.* Bot. 411, name only. "*C. hirsuta* Hua ?" Stapf 620. A stout climber, with tendrils, the branches densely hirsute when young.
Liberia : Greenville ! Ivory Coast : Guidéko (May) ! Gold Coast : ? locality. Exsicc.—*Sim* 35. *Dudgeon* 108a and b. *Chev.* 16405. (See Appendix).

7. **C. rufinervis** *Pierre*—F.T.A. 4, 1 : 79. A climbing shrub.
S. Nigeria : Oban ! Also in Gabon and Portuguese Congo. Exsicc.—*Talb.* 299 ; 2030.

8. **C. macrantha** *K. Schum.*—F.T.A 4, 1 : 85. A glabrous climbing shrub with tendrils.
Sierra Leone : Talla hills, near Ninia (fr. Feb.) ! Heddle's Farm (May) ! ? locality ! Exsicc.—*Afzelius*. *Sc. Elliot* 4924. *Lane-Poole* 250. (See Appendix).

9. **C. landolphioides** *Stapf*—F.T.A. 4, 1 : 80. A stout climbing shrub with tendrils and attractive white fragrant flowers.
S. Nigeria : Cross River district ! Cameroons Mt., below Buea (Feb.) ! Exsicc.—*Dalz.* 8242. *Deistel* 144; 556. (See Appendix).
Superficially very similar to *Landolphia Dawei* Stapf, from Uganda, and suspected to be the same by Gilg (Notizbl. Bot. Gart. Berl. 5 : 69). Amongst other differences the completely glabrous corolla serves to distinguish *C. landolphioides* from *Landolphia Dawei*.

10. **C. dulcis** *Sabine*—F.T.A. 4, 1 : 76 ; Stapf in Hook Ic. Pl. t. 2568 ; Holl. 3 : 436 ; Chev. Bot. 410. *C. acida* Sabine ? A climber with tendrils, usually softly brownish-yellow pubescent ; flowers pale blue.
French Sudan : Kangala (May) ! Moussaia. Senegambia : Casamance. French Guinea and Sierra Leone—common ! Liberia : Sino, Greenville ! Togo : Misahöhe (Nov.) ! S. Nigeria : Lagos island and mainland, common (Sept.) ! Also in Cape Verde Islands. Exsicc.—*Don*. *Kirk* 37. *Sc. Elliot* 4249 ; 4275a ; 4294 ; 5091 ; 5127 ; 5885. *Sim* 7. *Farmar* 194 ; 321. *Dalz.* 992. *Heudelot*. *Pobéguin* 703. *Mildbraed* 7392. (See Appendix).

11. **C. oxyanthoides** *Wernham* in Cat. Talb. Nig. Pl. 61. A glabrous climber with tendrils.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.* 1443.

12. **C. Baumannii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *C. Barteri* Stapf in F.T.A. 4, 1: 77, partly, as to *Baumann* 304. A woody climber with purplish flowers.
Togo : Misahöhe (May) ! Exsicc.—*Baumann* 304.

13. **C. Talbotii** *Wernham* l.c. A glabrous climber with rather broad leaves.
S. Nigeria : Oban ! Exsicc.—*Talb.* 1055.

14. **C. violacea** *K. Schum.*—F.T.A. 4, 1 : 80. A climbing shrub, glabrous except on the inflorescence, the flowers pale violet.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.* 1445. (See Appendix).

*Imperfectly known species.*

**C. littoralis** *A. Chev.* Bot. 411, name only. This is a mixture of imperfect material.

## 8. PLEIOCERAS Baill.—F.T.A. 4, 1 : 165.

Inflorescence glabrous, lax, subcorymbose ; pedicels slender, up to 2 cm. long ; branchlets glabrous ; leaves ovate or ovate-elliptic, acuminate, abruptly acute at the base, 5–8 cm. long, 3–5 cm. broad, glabrous, with about 5 pairs of lateral nerves ; calyx 3 mm. long, lobes broadly ovate, rounded at the apex ; corolla 1·4 cm. long, the limb minutely puberulous outside .. .. .. .. .. .. .. 1. *Afzelii*
Inflorescence softly pubescent or puberulous, dense, thyrsoid :
  Leaves pubescent below, oblong, acuminate, subacute at the base, 7–15 cm. long, 3–5 cm. broad, softly and very shortly pubescent below, with about 10 pairs of lateral nerves ; calyx very short ; corolla 5 mm. long, minutely puberulous ; fruiting carpels paired, linear, about 30 cm. long ; seeds spindle-shaped, 1·5 cm. long, covered with long soft hair .. .. .. .. .. .. .. 2. *Barteri*
  Leaves glabrous below, oblong, more or less caudate-acuminate, rounded at the base, 7–14 cm. long, 3–6 cm. broad, with 6–8 pairs of lateral nerves ; inflorescence and fruit as in *P. Barteri* .. .. .. .. .. .. .. 3. *Zenkeri*

1. **P. Afzelii** *Stapf*—F.T.A. 4, 1 : 166. *P. Whytei* Stapf l.c. 604 ; Stapf 628. A glabrous shrub or tree up to 30 ft., with panicles of rather small flowers having a fringe of filiform appendages in the throat.
Sierra Leone : Freetown, Heddle's Farm (Mar.) ! Liberia : Sino R. ! Exsicc.—*Afzelius*. *Smeathmann*. *Lane-Poole* 217. *Whyte*.

2. **P. Barteri** *Baill.*—F.T.A. 4, 1 : 166 ; Chev. Bot. 417. *P. Whytei* A. Chev. Bot. 417, not of Stapf. A shrub or small tree, greyish-pubescent on the young leaves and inflorescence, the older branches red-brown and glabrous, with panicles of small yellow flowers and long narrow follicles up to 18 in. or more.
Ivory Coast : various localities ! Gold Coast : Half Assinie (fl. and fr. July) ! Sekondi (Nov.) ! Dahomey and Lagos Colony, very common ! Benin ! Calabar (Mar.) ! Exsicc.—*Carter* 2170 ; 3278. *Moloney*. *Rowland* 57. *Millen* 103 ; 177. *Millson* 4. *Chev.* 15190 ; 16013 ; 17903 ; 17956. *Schlechter* 13008. (See Appendix).

3. **P. Zenkeri** *Stapf*—F.T.A. 4, 1 : 166. *P. glaberrima*, *P. oblonga*, *P. stapfiana* and *P. Talbotii* Wernham. A climbing shrub with glabrous foliage, and cream-yellow flowers with reddish centre about ⅓ in. long.
S. Nigeria : Oron to Eket and district ! Also in Cameroons. Exsicc.—*Talb.* 3008 ; 3038 ; 3111 ; 3390. (See Appendix).

### 9. **LOCHNERA** Reichb.—F.T.A. 4, 1 : 118.

Small shrub; stems softly pubescent; leaves in pairs, with glands at the base, obovate to oblanceolate, rounded at the apex, 4–8 cm. long, 2–4 cm. broad, thinly pubescent; flowers axillary, solitary or paired; calyx-lobes subulate; corolla up to 4 cm. long, with broad spreading limb; fruits paired, 2–3 cm. long, dehiscent, ribbed and pubescent .. .. .. .. .. .. .. *rosea*

**L. rosea** *Reichb.*—F.T.A. 4, 1 : 118; Holl. 3 : 442; Chev. Bot. 413. The "Madagascar Periwinkle," a native of tropical America, with white or pink flowers, often planted in villages and now naturalised in the tropics.

### 10. **PLEIOCARPA** Benth.—F.T.A. 4, 1 : 97.

Lateral nerves of the leaves few and distant, about 6–8 (rarely 10) pairs; usually with numerous oblique and often faint tertiary nerves:

Corolla about 1·5 cm. long; carpels 2; leaves elliptic, acuminate, about 12 cm. long and 6 cm. broad; tertiary nerves conspicuous below; calyx-lobes ovate-lanceolate, 2 mm. long; fruiting carpels divergent, long-beaked .. .. .. 1. *Simii*

Corolla 3 cm. long or more; carpels 3 or more:

Leaves narrowly oblong, with very slightly prominent lateral nerves, 16–18 cm. long, 4–6 cm. broad, broadly and rather gradually acuminate, cuneate at the base; flowers clustered at the nodes, sessile .. .. .. .. 2. *tricarpellata*

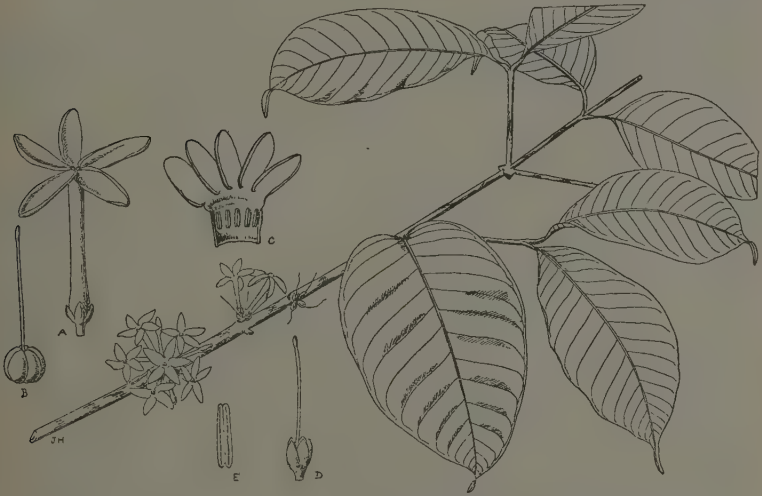


FIG. 191.—PLEIOCARPA MUTICA *Benth.* (APOCYNACEAE).

A, flower. B, pistil. C, upper part of corolla laid open. D, calyx and style. E, anther.

Leaves more or less broadly elliptic, or oblong, with very prominent lateral nerves below:

Carpels 5; leaves oblong, 12–18 cm. long, 4–6 cm. broad, gradually acuminate, shining, closely reticulate.. .. .. .. .. .. .. 3. *Talbotii*

Carpels 3; leaves elliptic or slightly obovate-elliptic, 12–18 cm. long, 6–10 cm. broad, abruptly and shortly acuminate; young fruits rugose, beaked 4. *rostrata*

Lateral nerves of the leaves numerous and rather close and parallel, 12 or more pairs:

Carpels 3–5:

Leaves elliptic or oblong, rather abruptly acuminate, 8–16 cm. long, 4–6·5 cm. broad, shining above; carpels 5 .. .. .. .. .. .. .. 5. *mutica*

Leaves lanceolate, gradually acuminate, 10–13 cm. long, 2·5–3 cm. broad, shining above; carpels 3–4 .. .. .. .. .. .. 6. *salicifolia*

Carpels 2:

Corolla 1·5 cm. long; leaves oblong or oblong-elliptic, caudate-acuminate, 8–16 cm. long, 2·5–5 cm. broad, shining above; flowers sessile, in axillary clusters 7. *bicarpellata*

Corolla less than 1 cm. long:

Corolla nearly 1 cm. long; leaves narrowly oblong, at most 4 cm. broad 8. *flavescens*

Corolla about 0·5 cm. long; leaves broadly oblong or elliptic, over 5 cm. long 9. *micrantha*

1. **Pleiocarpa Simii** *Stapf* MS. *Polyadoa* (?) *Simii* Stapf in Johnston Liberia 2 : 624. *Picralima laurifolia* A. Chev. ? A glabrous shrub with clusters of white flowers ½–¾ in long.
Liberia: Sino district! Dukwia R. (fr. Feb.)! Ivory Coast: various localities! Exsicc.—*Sim* 16. *G. P. Cooper* 169. *Chev.* 19311.
2. **P. tricarpellata** *Stapf* in Kew Bull. 1915 : 47. *P. bakueana* A. Chev. *P. ternata* A. Chev. A glabrous shrub with angled branchlets and axillary clusters of slender white flowers 1–1½ in. long.
Sierra Leone: Falaba (Apr.)! Kambui Reserve (Mar.)! Ivory Coast: various localities! Exsicc.—*Aylmer* 35. *Lane-Poole* 333. *Chev.* 19432; 19434; 19519; 19572; 19722; 20011.
3. **P. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 62. A glabrous tree with slender white flowers about 1–1½ in. long.
S. Nigeria: Oban! Exsicc.—*Talb.* 1037.
4. **P. rostrata** *Benth.*—F.T.A. 4, 1 : 98; Ic. Pl. t. 1182. A shrub with purple-brown branchlets, white tubular flowers quite 1½ in. long, and warty, long-beaked fruits 1½ in. long.
S. Nigeria: Cameroons R. (Jan.)! Also in French Cameroons. Exsicc.—*Mann* 720; 2189.
5. **P. mutica** *Benth.*—F.T.A. 4, 1 : 98; Ic. Pl. t. 1181; Holl. 3 : 439. A shrub or small tree, up to 25 ft. high, in forest undergrowth with dark brown branchlets and clusters of white flowers sometimes in the axils of fallen leaves.
Liberia: Dukwia R. (Feb.)! Gold Coast: Ashanti, Asanwinso (Feb.)! S. Nigeria: Oban! Calabar (Feb., Mar.)! Cross River! Rio del Rey! Also in French Cameroons. Exsicc.—*Mann* 2277. *Thomson* 38. *Johnston*. *Holland* 106. *Vigne* 986. *G. P. Cooper* 248.
6. **P. salicifolia** *Stapf*—F.T.A. 4, 1 : 99. A shrub or small tree with purple-brown branchlets and white flowers about ¾ in. long.
Sierra Leone: Freetown (May)! Wyema (Mar.)! Exsicc.—*Barter* (no number). *Aylmer* 216.
7. **P. bicarpellata** *Stapf*—F.T.A. 4, 1 : 99. A shrub or small tree with slightly angled branchlets and white flowers ½–¾ in. long.
Cameroons Mt., 4,000 ft. (Feb.)! Barombi! Johann-Albrechtshöhe! Also in French Cameroons. Exsicc.—*Mann* 1213. *Preuss* 44. *Staudt* 573; 683; 791.
8. **P. flavescens** *Stapf*—F.T.A. 4, 1 : 101. A shrub or small tree with clustered small white flowers in the axils, the bark on the branchlets splitting up longitudinally.
French Sudan: Kerfomouria, at edge of marsh (Mar.)! Gold Coast: Aburi Hills (Feb.)! Akropong (Oct.)! Togo: Lome! S. Nigeria: near Erin! Exsicc.—*Johnson* 616; 803. *Foster* 182. *Chev.* 597. *Warnecke* 481. *Buettner* 621.
9. **P. micrantha** *Stapf*—F.T.A. 4, 1 : 100. A small tree about 20 ft. high, with short white flowers in clusters often in the axils of fallen leaves.
Gold Coast: Akropong (Mar.)! at foot of Aburi Hills (Mar.)! Exsicc.—*Johnson* 623; 903.

## 11. RAUWOLFIA Linn.—F.T.A. 4, 1 : 108.

Branchlets sharply angular or winged; whorls of leaves crowded, subsessile, obovate, shortly and obtusely pointed, 15–20 cm. long, 6–9 cm. broad, with numerous spreading lateral nerves; inflorescence glabrous; corolla 4–5 mm. long; fruits globose or ellipsoid, about 1 cm. long .. .. .. .. .. .. 1. *macrophylla*
Branchlets terete or obtusely quadrangular; whorls of leaves not crowded, petiolate:
  Branches of inflorescence distinctly puberulous, divaricate; leaves narrowly obovate, acutely acuminate, up to 18 cm. long and 8 cm. broad, with 10–16 pairs of looped lateral nerves; corolla about 7 mm. long; fruiting carpels ovoid, solitary or paired, 8 mm. long .. .. .. .. .. .. .. .. 2. *vomitoria*
  Branches of inflorescence glabrous:
    Lateral nerves over 20 pairs, spreading; leaves elongate-oblanceolate, acutely acuminate, narrowed to the base, 10–20 cm. long, 3–6 cm. broad; petiole up to 4 cm. long; corolla 6 mm. long .. .. .. .. .. 3. *Welwitschii*
    Lateral nerves 10 pairs or less; leaves narrowly obovate or oblanceolate, acutely acuminate, long-attenuated to the base, up to 15 cm. long and 6 cm. broad, thin; corolla 7 mm. long:
      Carpels free in fruit, obliquely elliptic, 1–1·2 cm. long .. .. 4. *Cumminsii*
      Carpels connate beyond the middle, 1 cm. long .. .. .. .. 5. *Preussii*

1. **Rauwolfia macrophylla** *Stapf*—F.T.A. 4, 1 : 110. A glabrous tree 40–50 ft. high with stout 4-angled branchlets, the leaf-whorls crowded.
S. Nigeria: Ambas Bay (Dec.)! Tiko (Jan.)! Likomba! Also in French Cameroons and San Thomé. Exsicc.—*Mann* 1328. *Dunlap* 248. *Mildbr.* 10783. (See Appendix).
2. **R. vomitoria** *Afz.*—F.T.A. 4, 1 : 115; Holl. 3 : 440; Chev. Bot. 412. A shrub up to about 20 ft. high, glabrous except on the inflorescence of small whitish flowers in dichotomous cymes; berries smooth red, ¼ in. long.
Common from Senegal to Cameroons, north to Nupe in N. Nigeria, and distributed throughout the northern parts of tropical Africa. Exsicc.—*Afzelius*. *Don* 7. *T. Vogel* 50; 103. *Barter* 1704; 2091. *Irving* 64. *Mann* 750. *Thomson* 54; 120. *Whyte*. *Sim*. *Rowland*. *Millen* 20. *Sc. Elliot* 4356; 4823; 5501; 5318. *Preuss* 903. *Schlechter* 13037. *Debeaux* 173. *Warnecke* 432. *Staudt* 856. (See Appendix).
3. **R. Welwitschii** *Stapf*—F.T.A. 4, 1 : 110. A small tree with rather angular branchlets and leaves in whorls of 3 or 4.
N. Nigeria: Zaria (July)! Auchang (Feb.)! Katsina Allah (June)! Also in Congo and Angola. Exsicc.—*Dalz.* 358; 796. *Lamb*. (See Appendix).
4. **R. Cumminsii** *Stapf*—F.T.A. 4, 1 : 114 and 601; Stapf 624. *R. liberiensis* Stapf—F.T.A. 4, 1 : 601. *R. ivorensis* A. Chev. A glabrous shrub with slender 4-angled branchlets and paired red berries.
Liberia: Sino Basin! Monrovia! Ivory Coast: Aboisso (Mar.)! Gold Coast: Assin Yan Kumasi Awiabo (Nov.)! Exsicc.—*Cummins* 216. *Whyte*.
5. **R. Preussii** *K. Schum.*—F.T.A. 4, 1 : 114.
S. Nigeria: Oban! Barombi! Also in French Cameroons. Exsicc.—*Talb.* 45. *Preuss* 342. *Chev.* 17782.

## 12. CALLICHILIA Stapf—F.T.A. 4, 1 : 130.

Calyx-lobes narrowly lanceolate or oblong-lanceolate, very acute:
  Calyx-lobes 1 cm. long or a little less:
    Leaves subsessile, oblanceolate or obovate-elliptic, very acutely acuminate, 9–16 cm.

long, 3–7 cm. broad, glabrous, with about 8 pairs of lateral nerves ; corolla 4 cm. long, contracted about the middle ; lobes broad, overlapping to the right 1. *stenosepala*

Leaves petiolate, elongate-oblong or oblanceolate, triangular-acuminate, up to 25 cm. long and 9 cm. broad, glabrous, with 6–8 pairs of lateral nerves ; corolla 6–7 cm. long, contracted above the middle of the tube, lobes lanceolate, overlapping to the left .. .. .. .. .. .. .. .. 2. *monopodialis*

Calyx-lobes 3–3·5 cm. long ; leaves petiolate, oblong-obovate, acuminate, 14–28 cm. long, up to 10 cm. broad, thin, glabrous, with 7–12 pairs of lateral nerves ; pedicels 1 cm. long ; corolla-tube about 9 cm. long, lobes 4 cm. long .. 3. *magnifica*

Calyx-lobes broadly oblong-elliptic, rounded or mucronate at the apex, much less than 1 cm. long :

Leaves fairly long-petiolate, oblanceolate to obovate, acutely acuminate, narrowed to the base, 8–20 cm. long, 3–8 cm. broad, glabrous, with 7–9 pairs of lateral nerves ; corolla about 6·5 cm. long, with a cylindrical contracted base about 1 cm. long and lobes overlapping to the left ; fruiting carpels divergent, recurved, beaked, about 3 cm. long .. .. .. .. .. .. .. .. .. 4. *Barteri*

Leaves sessile or subsessile :

Stamens above the middle of the corolla-tube ; corolla 6 cm. long ; leaves obovate-elliptic, acutely acuminate, 10–16 cm. long, 4–7 cm. broad, with about 8 pairs of lateral nerves, calyx-lobes 7–8 mm. long, keeled ; corolla-lobes overlapping to the left .. .. .. .. .. .. .. .. .. .. 5. *Mannii*

Stamens about or below the middle of the corolla-tube ; leaves and flowers very similar to those of *C. Mannii* but corolla-lobes overlapping to the right 6. *subsessilis*

1. **Callichilia stenosepala** *Stapf*—F.T.A. 4, 1 : 602 ; Stapf in Johnston, Liberia, 2 : 626, t. 255. A shrub erect or half-straggling, with white tubular flowers about 1½ in. long.
Liberia : Sino R., Grant's Farm ! S. Nigeria : Ala (Nov.) ! Degema ! Exsicc.—*Whyte. N. W. Thomas* 1973 ; *Talb.* 3752.

2. **C. monopodialis** *Stapf*—F.T.A. 4, 1 : 131.
S. Nigeria : Barombi ! Johann Albrechtshöhe ! Also in French Cameroons. Exsicc.—*Preuss* 310.

3. **C. magnifica** *R. Good* in Journ. Bot. 1929 : Suppl. 86. A shrub in forest undergrowth with rather large fragrant white flowers.
S. Nigeria : Oban ! Also in Portuguese Congo. Exsicc.—*Talb.*

4. **C. Barteri** *Stapf*—F.T.A. 4, 1 : 133 ; Holl. 3 : 444 ; Chev. Bot. 416. A glabrous erect shrub with white fragrant flowers 2½ in. long.
Ivory Coast : Makoulé ; Agniéby valley, Voguié. Gold Coast : Axim district ! Dahomey : Porto Novo and environs. N. Nigeria : Lokoja (Mar.) ! between Lafia and Jemaa, 1,000–1,500 ft. (Apr.) ! S. Nigeria : various localities from Lagos Colony to Calabar. Exsicc.—*Barter* 86 ; 1653 ; 3284 ; 3357. *Mann* 2271. *Irving* 132. *Burton. Millson* 610. *Millen* 170. *Rowland. Talb.* 3831. *Schlechter* 12301. (See Appendix).

5. **C. Mannii** *Stapf*—F.T.A. 4, 1 : 131. A climbing shrub with white flowers over 2 in. long.
S. Nigeria : Ambas Bay (Dec.) ! Also in N.W. Cameroons. Exsicc.—*Mann* 2152.

6. **C. subsessilis** *Stapf*—F.T.A. 4, 1 : 132 ; Stapf 626 ; Chev. Bot. 416. A shrub erect or half-straggling with white flowers similar to the preceding, and paired fruits beaked, about 1 in. or more long.
Common from French Guinea to Gold Coast ! Also S. Nigeria : Oban ! Exsicc.—*T. Vogel* 4 ; 5. *Carder. Sc. Elliot* 5565 ; 5590. *Cummins* 48 ; 235. *Johnson* 762 ; 765. *Talb.* (no number). *Dinklage* 6263. (See Appendix).

## 13. GABUNIA K. Schum.—F.T.A. 4, 1 : 136.

Peduncle short :

Corolla-tube (in the open flower) 1 cm. long, lobes ciliolate, nearly 1 cm. long ; calyx-lobes narrowly ovate, 3 mm. long ; leaves oblanceolate, gradually acuminate, acute at the base, about 10 cm. long and 3·5 cm. broad, with about 7 pairs of lateral nerves ; pedicels about 7 mm. long .. .. .. .. .. .. 1. *psorocarpa*

Corolla-tube (in the open flower) 3·5 cm. long or more :

Calyx without glands within the base, lobes up to 6 mm. long ; corolla-tube up to 6·5 cm. long, lobes linear to lanceolate, about 4 cm. long ; leaves elliptic, acuminate, 10–15 cm. long, 3·5–7 cm. broad, glabrous ; petiole about 1 cm. long ; fruits up to 5 cm. long .. .. .. .. .. .. .. .. 2. *eglandulosa*

Calyx with glands within the base, lobes ovate-triangular, 4 mm. long ; corolla-tube about 9 cm. long in the open flower, lobes linear-lanceolate, 2 cm. long ; leaves oblong, very acutely acuminate, the larger about 14 cm. long and 5 cm. broad, sparingly gland-dotted below .. .. .. .. .. 3. *glandulosa*

Peduncle 8–11 cm. long, stout, many-flowered ; corolla-tube 4·5 cm. long, twisted and ribbed at the base, lobes 1–1·5 cm. long ; leaves broadly obovate-elliptic, broadly cuneate at the base, 15–18 cm. long, 8–9 cm. broad, glabrous, with 8–11 pairs of lateral nerves ; petiole very short .. .. .. .. .. 4. *Dorotheae*

1. **Gabunia psorocarpa** *Pierre*—F.T.A. 4, 1 : 137. A glabrous climbing shrub with white tubular flowers.
Liberia : Yeh River (Oct.) ! Gold Coast : Awiaho, Axim district (Nov.) ! S. Nigeria : Eket. Also in Gabon. Exsicc.—*Talb.* 3228 A. *Vigne* 1467. *Linder* 999.

2. **G. eglandulosa** *Stapf*—F.T.A. 4, 1 : 138. *G. longiflora* Stapf—F.T.A. 4, 1 : 138. A glabrous climbing shrub with white flowers and orange-red fruit.
S. Nigeria : Epe ! Ikirun (Feb.) ! Eket ! Degema ! Oban ! Fernando Po (Jan.) ! Also in Cameroons. Exsicc.—*Barter* 3306. *Mann* 239. *Millson* 12. *Talb.* 1525 ; 3830.
var. **macrocalyx** *Stapf*—F.T.A. 4, 1 : 139. Calyx-lobes 1 cm. long.
S. Nigeria : Calabar (Feb.) ! Exsicc.—*Mann* 2253.

3. **G. glandulosa** *Stapf*—F.T.A. 4, 1 : 138 ; Stapf 626 ; Chev. Bot. 417. A glabrous climbing shrub with corymbs of white tubular flowers over 3 in. long.
Sierra Leone : Regent (Apr.) ! York Pass (July) ! Liberia : Monrovia and Sino Basin ! Ivory Coast : several localities. Gold Coast : Kwahu, 2,000 ft. (Apr.) ! Aburi Hills (July, Oct.) ! Dahomey : Lower Ouémé. S. Nigeria : Oban ! Exsicc.—*Sc. Elliot* 5821. *Lane-Poole* 310. *Whyte*. *Johnson* 477 ; 669 ; 1085. *Talb*. 1481.

4. **G. Dorotheae** *Wernham* in Journ. Bot. 1914 : 25. A shrub, probably climbing, with subcoriaceous leaves and corymbs of tubular white flowers.
S. Nigeria : Eket ! Exsicc.—*Talb*. 3387.

### 14. PICRALIMA Pierre—F.T.A. 4, 1 : 96 ; see also Stapf in Kew Bull. 1908 : 302.

Corolla 3.5 cm. long, lobed to about the middle, glabrous outside, the tube ribbed ; branchlets terete, glabrous ; leaves oblong-lanceolate to broadly oblong-elliptic, shortly acuminate, rounded to slightly cuneate at the base, up to 23 cm. long and 10 cm. broad, with numerous parallel nerves, shining on the upper surface, glabrous ; inflorescence terminal, very shortly pedunculate ; pedicels stout, up to 1 cm. long ; calyx-lobes triangular-ovate, obtuse, keeled, leathery, about 8 mm. long ; fruit of one or two large broadly ellipsoid baccate divaricate mericarps ; seeds about 2 cm. long .. .. .. .. .. .. .. .. .. .. 1. *nitida*

Corolla below 1·5 cm. long ; calyx-lobes not keeled :

Lateral nerves distant and much more prominent than those between, about 10–12 pairs ; leaves oblong-elliptic, very obtusely acuminate, shortly cuneate at the base, 12–20 cm. long, 5–10 cm. broad, glabrous ; petiole about 2 cm. long ; inflorescence subsessile, many flowered ; calyx-lobes small, rounded .. 2. *umbellata*

Lateral nerves numerous and scarcely more prominent than those between, about 16–18 pairs ; leaves elliptic, rather gradually and obtusely acuminate, 8–14 cm. long, 4–7 cm. broad, glabrous ; inflorescence subsessile to pedunculate, many-flowered, viscid ; calyx-lobes rounded, sticky .. .. .. .. 3. *Elliotii*

1. **Picralima nitida** *Th. & Hél. Dur.* Syll. Fl. Congol. 338. *P. Klaineana* Pierre—F.T.A. 4, 1 : 96 ; Holl. 3 : 439 ; Chev. Bot. 427 (*P. Klainei*). *P. macrocarpa* A. Chev. A tree up to 80 ft. high with white flowers in a terminal inflorescence, and very large paired fruits.
Ivory Coast: Anoumaba (Nov.) ! Gold Coast : Aburi (Sept.) ! Adeambra (May) ! Obuasi ! S. Nigeria : Agege ! Onitsha ! Ogwashi ! Idumuye (Dec.) ! Eket ! Oban ! Ambas Bay (Jan.) ! Victoria Bot. Garden ! Extends to Congo and probably Uganda. Exsicc.—*Mann* 710. *Foster* 220. *Soward* 651. *Vigne* 864. *Talb*. 219 A. ; 1690 ; 3146 ; 3256. *Imp. Inst*. H/1921/20. *Winkler* 660. Chev. 22391 ; 22440. (See Appendix).

2. **P. umbellata** *Stapf* in Kew Bull. 1908 : 302. *Polyadoa umbellata* Stapf—F.T.A. 4, 1 : 103 ; Holl. 3 : 440. A small tree up to about 30 ft. high, with white or yellowish-white flowers in a terminal umbelliform cluster.
S. Nigeria : Ibadan Forest (Nov.) ! ? locality ! Also in Cameroons. Exsicc.—*Punch* 138. *Foster* 5. *Unwin* (no number). (See Appendix).

3. **P. Elliotii** *Stapf* l.c. *Polyadoa Elliotii* Stapf—F.T.A. 4, 1 : 104 ; Holl. 3 : 440 ; Chev. Bot. 427. *P. gracilis* A. Chev. A small tree or shrub erect or climbing, with flowers like those of the preceding.
Sierra Leone : Limba, near Makunde (Apr.) ! Kessewe (Apr.) ! Ivory Coast : various localities ! Gold Coast : Axim ! S. Nigeria : Oloke Meji. Exsicc.—*Sc. Elliot* 5690. *Lane-Poole* 129. *Chev*. 13804 ; 16310; 20013. (See Appendix).

### 15. CONOPHARYNGIA G. Don—F.T.A. 4, 1 : 139.

Corolla-tube of the open flower not more than 3 cm. long :

Cymes subsessile ; flowers several ; calyx 5 mm. long ; corolla 1·5–2 cm. long, constricted below the limb ; leaves obovate-elliptic, acutely acuminate, cuneate at the base, 8–23 cm. long, 3–8 cm. broad, glabrous, with 9–12 pairs of lateral nerves 1. *penduliflora*

Cymes pedunculate :

Calyx-lobes 8–9 mm. long ; corolla-tube about 1 cm. in diam. at its widest part ; leaves very large, ovate or elliptic, rounded to a shortly contracted base, up to 40 cm. long and 25 cm. broad, with up to 15 pairs of lateral nerves 2. *pachysiphon*

Calyx-lobes up to 6 mm. long ; corolla-tube much less than 1 cm. at its widest part :

Corolla-tube 2 cm. long :

Corolla-tube glabrous within above the anthers ; leaves elliptic, very shortly pointed, 15–35 cm. long and up to 15 cm. broad, with up to 10 pairs of lateral nerves .. .. .. .. .. .. .. .. .. 3. *crassa*

Corolla-tube pubescent within above the anthers ; leaves obovate-elliptic, 20–30 cm. long, 10–15 cm. broad, glabrous .. .. .. .. 4. *Cumminsii*

Corolla-tube 1 cm. long ; leaves broadly elliptic, shortly acute, rounded at the base, 15–40 cm. long, 7–25 cm. broad, glabrous, with widely-arching lateral nerves ; inflorescence branched, with numerous flowers .. .. 5. *brachyantha*

Corolla-tube of the open flower 4 cm. or more long :

Calyx-lobes 1 cm. long or more :

Calyx-lobes 2 cm. long, very rounded at the apex, thin ; leaves narrowly elliptic-oblong to elliptic, acutely acuminate, 12–30 cm. long, 5–12 cm. broad, with 10 or more pairs of lateral nerves .. .. .. .. .. .. 6. *Chippii*

Calyx-lobes 1 cm. long :

Corolla-tube 7–10 cm. long ; anther-swelling about 2·5 cm. above the base of the corolla-tube ; leaves obovate-elliptic to oblanceolate, shortly acuminate, 10–20 cm. long, 6–10 cm. broad, glabrous .. .. .. .. .. 7. *longiflora*

Corolla-tube about 6 cm. long; anther-swelling near the base of the corolla-tube, the latter markedly spirally twisted; leaves widely obovate-elliptic, very shortly acuminate, up to 40 cm. long and 20 cm. broad, glabrous .. 8. *contorta*

Calyx-lobes up to about 5 mm. long; corolla spirally twisted from the base, slender, 6–7 cm. long, with rather narrow lobes; leaves obovate-elliptic to oblong-obovate, shortly acuminate, 15–25 cm. long, 6–11 cm. broad, glabrous, with 7–11 pairs of lateral nerves .. .. .. .. .. .. .. .. 9. *durissima*

1. **Conopharyngia penduliflora** *Stapf*—F.T.A. 4, 1 : 149, 603. A glabrous shrub or tree with white flowers ½–¾ in. long in very shortly pedunculate or subsessile short cymes.
S. Nigeria: Degema! Oban! Cross R. (Feb.)! Also in Cameroons and Congo. Exsicc.—*Talb.* 1506; 3711. *McLeod.*

2. **C. pachysiphon** *Stapf*—F.T.A. 4, 1 : 145; Holl. 3 : 444. A shrub or medium-sized tree with large smooth leaves and white fragrant flowers about 2 in. long with a wide fleshy tube to the corolla.
Togo: Klingfall! Okposso! Dahomey! S. Nigeria: Lagos Colony (Feb.)! Ibadan Forest Reserve (Apr.)! Asaba! Onitsha! Benin (July)! Exsicc.—*Barter* 1328. *Punch* 146. *Dennett* 68. *Unwin* 109. *Dodd* 413. *Poisson.* *Kersting* A. 634. *Von Doering* 296. (See Appendix).

3. **C. crassa** *Stapf*—F.T.A. 4, 1 : 144, 603; Stapf 628, t. 257; Chev. Bot. 415. A small tree with large leaves and white fleshy flowers 1–1½ in. long.
Liberia: Totokwelli, Medina (Oct.). Grand Bassa (July)! Sino Basin! Gold Coast: Kwahu, Obo! Exsicc.—*T. Vogel* 21. *Whyte* 19. *Kitson* 1190. *Linder* 1302. (See Appendix).

4. **C. Cumminsii** *Stapf*—F.T.A. 4, 1 : 145. A large glabrous shrub with rather large leaves, white flowers 1¼ in. long, and fruits 4 in. in diameter.
Gold Coast: Assin Yan Kumasi! Exsicc.—*Cummins* 114.

5. **C. brachyantha** *Stapf*—F.T.A. 4, 1 : 148. A tree 40–50 ft. high with white flowers 1 in. or more long.
S. Nigeria: Ubuluku (Dec.)! Oban! Victoria! Cameroons Mt., above Buea, 4,000–5,000 ft. (Feb.)! Fernando Po (Jan.)! Also in French Cameroons. Exsicc.—*Mann* 221. *Talb.* (no number). *N. W. Thomas* 2100. *Dalz.* 8346. *Maitland* 429. (See Appendix).

6. **C. Chippii** *Stapf* in Kew Bull. 1913 : 177. *C. longiflora* Stapf in Johnston Liberia 2 : 626, t. 256, not of F.T.A. 4, 1 : 142. *Tabernaemontana grandiflora* Hook.? A tree 15–20 ft. high with long white tubular flowers 3–3½ in. long.
Liberia: Sino Basin! Gold Coast: Jemma (Nov.)! Fwirem (May)! Anwhiaso Reserve (Oct.)! Kumasi (July)! Exsicc.—*Chipp* 353; 454. *Sim* 26. *Vigne* 168; 1351.

7. **C. longiflora** *Stapf*—F.T.A. 4, 1 : 142; Chev. Bot. 415. *C. crassa* A. Chev. Bot. 415, not of Stapf. A tree up to about 20 ft. high, with long tubular white flowers, the corolla-tube alone over 3 in. long.
Senegal: Carabane; Sédhiou. French Guinea and Sierra Leone: several localities! Ivory Coast Middle Comoé, Asikasso (Dec.)! Indenié, Bébou to Mbasso (Dec.)! Adzopé to Boudépé! Exsicc.—*Heudelot* 726. *T. Vogel* 151. *Barter* (no number). *Kirk* 23. *Sc. Elliot* 4001; 4576. *Farmar* 151. *Smythe* 74. *Debeaux* 140; 324. *Chev.* 22596; 22636. (See Appendix).

8. **C. contorta** *Stapf*—F.T.A. 4, 1 : 142. A tree 30–40 ft. high with large leaves and white fleshy tubular sweet-scented flowers, the stout tube alone 2–2½ in. long and much twisted.
S. Nigeria: Oban! Ambas Bay (Jan.)! Mayuko (Feb.)! Also in French Cameroons. Exsicc.—*Mann* 703. *Dalz.* 8223. *Talb.* (no number).

**C. durissima** *Stapf*—F.T.A. 4, 1 : 143; Holl. 3 : 444. *C. Jollyana* Stapf—F.T.A. 4, 1 : 144; Chev. Bot. 415. A tree up to 70 ft. high with white tubular flowers, the tube rather slender, more or less twisted and up to 3 in. long; fruits paired, obliquely ellipsoid, smooth, 3 in. long.
Sierra Leone: Pujehun (Apr.)! Liberia: Dukwia R. (Nov.)! Ivory Coast: several localities! Gold Coast: Axim (Dec.)! Tanosu (Dec.)! "Common in S.W. Gold Coast Colony." S. Nigeria: Oban! New Calabar! Calabar! Itu (Apr.)! Extends to Gabon. Exsicc.—*Jolly* 168. *Johnson* 893. *Thomson* 73. *Billington* 4. *Holland* 150. *Chipp* 33. *Aylmer* 62. *G. P. Cooper* 117; 221; 242. *Chev.* 15193; 16314. (See Appendix).

## 16. VOACANGA Thouars—F.T.A. 4, 1 : 151.

Leaves rounded at the apex, not acuminate, narrowly obovate, tapered to the base, 10–25 cm. long, 4–9 cm. broad, glabrous, with about 15 pairs of spreading lateral nerves running into the margin; petiole up to 1·5 cm. long; inflorescences usually paired from the forks, pedunculate; pedicels stout, about 1 cm. long; calyx 1·5 cm. long, shortly lobed; corolla-tube 1·5–1·8 cm. long; fruit globose, 5 cm. diam. or more .. .. .. .. .. .. .. .. .. .. 1. *obtusa*

Leaves acuminate:

Bracts caducous; leaves obovate to elliptic-oblanceolate, cuneate at the base, 8–20 cm. long, up to 9 cm. broad, glabrous or softly pubescent on the nerves below; lateral nerves up to about 15 pairs; inflorescence many-flowered, pedunculate, often paired; pedicels up to 1·5 cm. long; calyx about 1 cm. long, with broad lobes; corolla-tube a little longer than the calyx, with spreading limb .. .. .. 2. *africana*

Bracts persistent:

Bracts very broadly ovate, thick and leathery, about 1·3 cm. long; peduncles slender, drooping, about 10 cm. long; calyx leathery, 1 cm. long; corolla 1·5 cm. long; leaves oblong-oblanceolate, acutely acuminate, 12–20 cm. long, 3–5 cm. broad, with about 8 pairs of faint lateral looped nerves .. .. .. 3. *Zenkeri*

Bracts lanceolate to narrowly ovate:

Pedicels 2 cm. long; calyx oblique, 2 cm. long; corolla-lobes linear, 1·5 cm. long; leaves narrowly obovate-oblanceolate, very acutely acuminate, 12–22 cm. long, 3·5–7 cm. broad, thin, with about 10 pairs of lateral nerves fading towards the margin; flowers about 3–5 to each inflorescence .. .. 4. *caudiflora*

Pedicels up to 1 cm. long:

Leaves below (especially on the nerves) and inflorescence minutely puberulous; leaves obovate-elliptic, acutely acuminate, 10–15 cm. long, 3·5–6 cm. broad, with about 10 pairs of lateral nerves; petiole 1 cm. long; peduncle about 6 cm. long; calyx 1 cm. long .. .. .. .. .. .. 5. *diplochlamys*

Leaves below and inflorescence glabrous; leaves lanceolate-elliptic, very acutely acuminate, sharply cuneate at the base, 10–18 cm. long, 4–6 cm. broad, with 6–8 pairs of lateral nerves; petiole 1·5 cm. long; peduncle slender, up to 8 cm. long; calyx about 1 cm. long .. .. .. .. .. 6. *bracteata*

1. **Voacanga obtusa** *K. Schum.*—F.T.A. 4, 1 : 153, 603; Chev. Bot. 415. A glabrous tree up to about 30 ft. high with leaves crowded at the ends of the branches, and white waxy flowers 1–1½ in. long.
Gambia! French Guinea: Kaba Valley; Kindia (Mar.). Sierra Leone: several localities! Liberia: Dukwia R. (May)! Du River! Ivory Coast: Mankono, between Buandougou and Marabadiassa (July). Dahomey: Abomey, Bouguila (Feb.). N. Nigeria: Kontagora (Nov.)! Extends to Uganda and Angola. Exsicc.—*Sc. Elliot* 4481. *Dalz.* 9. *Lane-Poole* 93; 342. *G. P. Cooper* 172; 431. *Linder* 47. (See Appendix).

2. **V. africana** *Stapf*—F.T.A. 4, 1 : 157, 603; Holl. 3 : 445; Chev. Bot. 414. *V. eketensis*, *V. glaberrima*, *V. magnifolia*, *V. Talbotii* Wernham. A shrub or small tree up to 30 ft. like the last.
Senegal! Gambia: Bathurst! French Guinea and Sierra Leone: several localities! Ivory Coast: Bingerville (Dec.); Alépé (Feb.–Mar.); foot of Mt. Nouba near the sources of the Nuon (Apr.). Gold Coast: Axim (Jan.)! Half Assinie (fr. July)! Dunkwa! Peki Krepi (Nov.)! Kwahu Plateau (Apr.)! Togo: Misahöhe! Dahomey: Savalou, Cabolé (May). N. Nigeria: Nupe! Lokoja, Patti (Jan., Apr.)! Abinsi (Apr.)! S. Nigeria: common! Cameroons Mt. 4,000 ft. (Jan.)! Fernando Po (Jan.)! Extends to Congo. Exsicc.—*Heudelot* 89. *Skues*. *Barter* 1327; 3376. *Mann* 243. *Sc. Elliot* 4903; 5484. *Millen* 143. *Holl.* 94. *Punch* 146. *Johnson* 814. *Elliott* 48; 222. *Talb.* 1053; 2071; 3388; 3389; 3835. *Debeaux* 320. (See Appendix).

3. **V. Zenkeri** *Stapf*—F.T.A. 4, 1 : 159. *V. obanensis* Wernham. *V. psilocalyx* Wernham in Cat. Talb. Nig. Pl. 135, not of Pierre. A glabrous shrub with white waxy flowers subumbellate at the end of a drooping peduncle 4–9 in. long.
S. Nigeria: Oban! Also in Cameroons. Exsicc.—*Talb.* 302; 1290; 2071.

4. **V. caudiflora** *Stapf*—F.T.A. 4, 1 : 603, and Stapf 628, t. 258. A glabrous shrub with white flowers 1–1½ in. long, few on a slender pendulous peduncle, the corolla-lobes narrow tail-like.
Sierra Leone: Blama (Dec.)! Liberia: Monrovia! Exsicc.—*Whyte*. *Deighton* 315.

5. **V. diplochlamys** *K. Schum.*—F.T.A. 4, 1 : 160. A shrub or small tree about 15 ft. high with waxy white flowers ¾–1 in. long on slender paired peduncles.
S. Nigeria: Eket! Calabar! Adiabo (Mar.)! Barombi (Mar.)! Exsicc.—*Thomson* 39. *Holl.* 108. *Talb.* (no number). *Preuss* 14.

6. **V. bracteata** *Stapf*—F.T.A. 4, 1 : 160, incl. var. *lanceolata* Stapf l.c. 604; Stapf 628. A glabrous shrub more or less like the last with rather smaller flowers on slender usually single peduncles.
Sierra Leone: Bagroo R. (Apr.)! Pujehun! Matotoka (July)! Liberia: Sino basin! Dukwia R. (Feb.)! Gold Coast: Awiabo, W. Prov. (Nov.)! Also in Cameroons. Exsicc.—*Mann* 858. *Sim* 34. *Whyte*. *Vigne* 1465. *N. W. Thomas* 1368; 8091. *G. P. Cooper* 219.

## 17. ALSTONIA R.Br.—F.T.A. 4, 1 : 120.

Branchlets glabrous; leaves in whorls of 4–7, obovate to elongate-oblanceolate, rounded to acutely acuminate, narrowed to the base, up to 25 cm. long and 8 cm. broad, very glaucous-green below, with numerous parallel spreading lateral nerves looped close to the margin; flowers in lax grey-puberulous terminal cymes; calyx and corolla densely puberulous, the latter 1·5 cm. long; fruit of two elongated slender whip-like softly tomentellous carpels; seeds oblong, rugulose, 0·5 cm. long, long-pilose at each end .. .. .. .. .. .. .. *congensis*

**A. congensis** *Engl.*—F.T.A. 4, 1 : 121; Holl. 3 : 443; Chev. Bot. 414. A tree up to 90 ft., with whorled branches and leaves.
French Sudan: Sinedone, Bignono (fr. May)! Common in the forest and by streams from Casamance and Gambia to S. Nigeria, and extending to E. Sudan, Uganda and Congo. Exsicc.—*Barter* 64; 302; 490. *Punch* 145. *Foster* 140. *Dawe* 37. *Armitage*. (See Appendix).
var. **glabrata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Inflorescence and calyx only slightly puberulous.
S. Nigeria: Lagos town (Oct.)! Exsicc.—*Dalz.* 1256.

## 18. HOLARRHENA R.Br.—F.T.A. 4, 1 : 161.

Corolla-tube glabrous or very slightly and minutely puberulous outside; pedicels glabrous or nearly so; leaves elliptic to lanceolate-elliptic, acutely acuminate, shortly cuneate to rounded at the base, 8–15 cm. long, up to 8 cm. broad, softly pubescent to glabrous below, with arched lateral nerves; calyx-lobes triangular, pubescent especially on the margin; fruits up to about 30 cm. long, slender 1. *Wulfsbergii*

Corolla-tube densely and shortly pubescent; pedicels and calyx outside softly pubescent; leaves, etc., more or less as above .. .. .. .. 2. *africana*

1. **H. Wulfsbergii** *Stapf*—F.T.A. 4, 1 : 164, 604; Holl. 3 : 446; Chev. Bot. 418. A tree up to about 50 ft. high with shining foliage, dense clusters of narrow-tubular white fragrant flowers, and long slender fruits.
French Guinea: Konakry (fr. Jan.)! Sierra Leone: Kaballa! Kuntaia (June)! Ivory Coast: summit of Mt. Goula (Apr.). Gold Coast: Aburi (Mar.)! Nsuta (May)! Kwahu, 2,000 ft. (Apr.)! Dahomey: Zagnanado, between Abbo and Massé (Feb.); Abomey (Feb.). N. Nigeria: between Tureta and Damri (June)! Bauchi! Keana (Apr., May)! S. Nigeria: Lagos, Ikoyi (Mar.)! Lagos Colony, several localities! Abeokuta! Ibadan Forest Reserve (Mar.)! Agolo! Ikorodu (Mar.)! Extends to Shari-Chad and Congo. Exsicc.—*Barter* 3334. *Irving*. *Brown* 326; 682. *Johnson* 654. *Dalz.* 534; 8079; 8080. *N. W. Thomas* 420; 1743. *Schlechter* 12296. (See Appendix).

2. **H. africana** *A.DC.*—F.T.A. 4, 1 : 164; Holl. 3 : 445; Chev. Bot. 417. *H. ovata* A.DC.—F.T.A. 4, 1 : 164; Chev. Bot. 418. A shrub or small tree like the last.
From Gambia and French Sudan to Lagos; in N. Nigeria north to Lokoja! Exsicc.—*Don*. *Heudelot* 795. *Barter* (no number). *Mann* 884. *Moloney*. *Ozanne* 9. *Sc. Elliot* 4469; 5180. *Farmar* 257. *Smythe* 19. *Dalz.* 208. *Chev.* 857. *Pobéguin* 140. *Schlechter* 12909. *Warnecke* 131. (See Appendix).

## 19. HOLALAFIA Stapf—F.T.A. 4, 1 : 201.

Branchlets glabrous; leaves broadly oblong-elliptic, very shortly and obtusely acuminate, rounded or truncate at the base, 10–18 cm. long, 5–9 cm. broad, glabrous, with about 8 pairs of lateral nerves looped and branched well within the margin; petiole about 1 cm. long; flowers in a dense terminal cluster; pedicels about 1 cm.

long, glabrous; calyx 3·5 mm. long, lobes keeled, glabrous; corolla about 2·5 cm. long, lobes broad; fruiting carpels curved, very long, glabrous .. 1. *multiflora*

Branchlets minutely pubescent when young, soon quite glabrous; leaves oblong, rather long-acuminate, rounded to subacute at the base, 8–14 cm. long, 4–6 cm. broad, glabrous, with about 6 pairs of rather obscure lateral nerves; petiole 6–8 mm. long; cyme terminal, rather dense, many-flowered, scurfy-puberulous; calyx 3–4 mm. long, puberulous, lobes ovate; corolla about 2·5 cm. long, lobes lanceolate; **fruit 15–17 cm. long, covered with a rusty felt .. .. .. 2. *jasminiflora***

1. **Holalafia multiflora** *Stapf*—F.T.A. 4, 1 : 201. A stout, glabrous, woody climber with hollow stems and corymbs of white flowers and long narrow fruits.
S. Nigeria: Ibadan Forest Reserve (Nov.)! Benin, Osayolu (Nov.)! Rio del Rey! Victoria (Nov.). Fernando Po! Extends to Congo. Exsicc.—*Mann* 1164. *Johnston* 44. *Punch* 49; 51. *Farquhar* 9. *Maitland* 754. (See Appendix).

2. **H. jasminiflora** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Alafia jasminiflora* A. Chev. Bot. 423. *A. mirabilis* A. Chev. l.c.
Ivory Coast: Bingerville! Bouroukrou (Dec.–Jan.)! Lower Comoé, Mbasso, in forest (Mar.)! Morénou, near Akabilékrou (Dec.)! Exsicc.—*Chev.* 16583 bis; 16644; 17606; 22507.

## 20. FUNTUMIA Stapf—F.T.A. 4, 1 : 189.

Flower-buds cylindric, about 2 cm. long, very blunt; corolla-lobes longer than the tube; leaves oblong-elliptic, subcaudate-acuminate, shortly cuneate at the base, 12–20 cm. long, 4–9 cm. broad, the 10–15 pairs of lateral nerves without pits in their axils; flowers in subsessile axillary clusters; fruits long and rigid; seeds with long-plumose **awns .. .. .. .. .. .. .. .. .. .. 1. *africana***

Flower-buds rather sharply conical, up to 1·2 cm. long; corolla-lobes shorter than the tube; leaves very similar to the above but with pits in the axils of the lateral nerves below .. .. .. .. .. .. .. .. .. .. 2. *elastica*

1. **F. africana** *Stapf*—F.T.A. 4, 1 : 190; Stapf 630; Chev. Bot. 425; Holl. 3 : 451; Hook. Ic. Pl. tt. 2696–2697. A tree up to 80 ft. or more high, with white flowers in dense axillary clusters, and spindle-shaped follicles 6–9 in. long.
Common in forest from French Guinea to Gabon and Fernando Po. Exsicc.—*Mann* 817. *Sc. Elliot* 4506. *Johnson* 434; 692; 925. *Holl.* 5; 160; 294. *Farquhar* 24. *Jolly* 169; 174. *G. P. Cooper* 373; 468. *Poisson*. *Kalbreyer* 82. *Preuss* 1382. (See Appendix).

2. **F. elastica** *Stapf*—F.T.A. 4, 1 : 191; Stapf 630; Chev. Bot. 426; Holl. 3 : 453; Hook. Ic. Pl. tt. 2694–95. A tree like the preceding, but yielding good rubber.
In forest from French Guinea to Cameroons and Congo, extending to Uganda. Exsicc.—*Cummins* 217. *Johnson* 255. *Sim*. *Millen* 178. *Smythe* 24; 78. *Holl.* 158; 159; 161; 162; 243. *Preuss* 1381. *Schlechter* 12319. (See Appendix).

## 21. ALAFIA Thouars—F.T.A. 4, 1 : 195.

Lateral nerves numerous and very oblique, looped and forming a crenulate nerve within the margin; leaves oblanceolate, very slightly acuminate, 4–9 cm. long, 2–4 cm. broad, glabrous, laxly reticulate between the nerves; corolla nearly 1·5 cm. long, glabrous or softly pubescent outside; fruiting carpels widely divergent, up to 25 cm. long, glabrous .. .. .. .. .. .. .. 1. *Benthamii*

Lateral nerves spreading, or if somewhat oblique very few; leaves oblong or elliptic, abruptly acuminate:

- Flowers about 2–3 in each inflorescence, the latter glabrous; corolla 1·8 cm. long, pubescent inside the base of the limb; leaves oblong, acutely acuminate, 8–10 cm. long, 3–4 cm. broad, with about 6 pairs of looped lateral nerves 2. *parciflora*
- Flowers numerous in each inflorescence:
  - Flowers subsessile in the inflorescence, the latter also subsessile; leaves broadly obovate-elliptic, abruptly acuminate, 10–18 cm. long, 5–8 cm. broad, thinly pubescent on the midrib below, with about 7 pairs of deeply looped lateral nerves; corolla 1·5 cm. long .. .. .. .. .. .. .. .. 3. *Whytei*
  - Flowers with pedicels over 2 mm. long; inflorescence mostly stalked:
    - Inflorescence very compact and subsessile; leaves oblong-obovate, abruptly acuminate, 7–10 cm. long, 4–5 cm. broad, glabrous; corolla 1·5 cm. long, the lobes as long as the tube; pedicels and calyx softly puberulous 4. *Schumannii*
    - Inflorescence lax and pedunculate:
      - Corolla-lobes longer than the tube:
        - Flowers yellow with a red centre; leaves narrowly obovate, rounded or slightly acuminate at the apex, 7–10 cm. long, 3–5 cm. broad, glabrous; lateral nerves 3–4 pairs; pedicels slender, 5 mm. long .. .. .. .. 5. *lucida*
        - Flowers white with a red centre; leaves oblong-elliptic, shortly acuminate, 7–10 cm. long, 3–5 cm. broad, glabrous, with about 10 pairs of lateral nerves; pedicels about 3 mm. long .. .. .. .. .. 6. *landolphioides*
      - Corolla-lobes shorter than the tube, white with a red centre; leaves obovate-elliptic or elliptic, very shortly acuminate, about 10 cm. long and 4 cm. broad, glabrous, with about 6 pairs of lateral nerves .. .. .. 7. *Barteri*

1. **Alafia Benthamii** *Stapf*—F.T.A. 4, 1 : 199; Chev. Bot. 422. A woody climber with shining, stiff, strongly veined leaves, greenish-yellow flowers with red centre, and narrow follicles 5–9 in. long.
French Guinea: ? locality! Sierra Leone: Mofari, Scarcies R. (Jan.)! Pujehun! Njala (Feb.)! Liberia: Sino, Greenville! S. Nigeria: Calabar! Also in Gabon. Exsicc.—*Thomson* 117. *Sc. Elliot* 4440. *Farmar* 324.

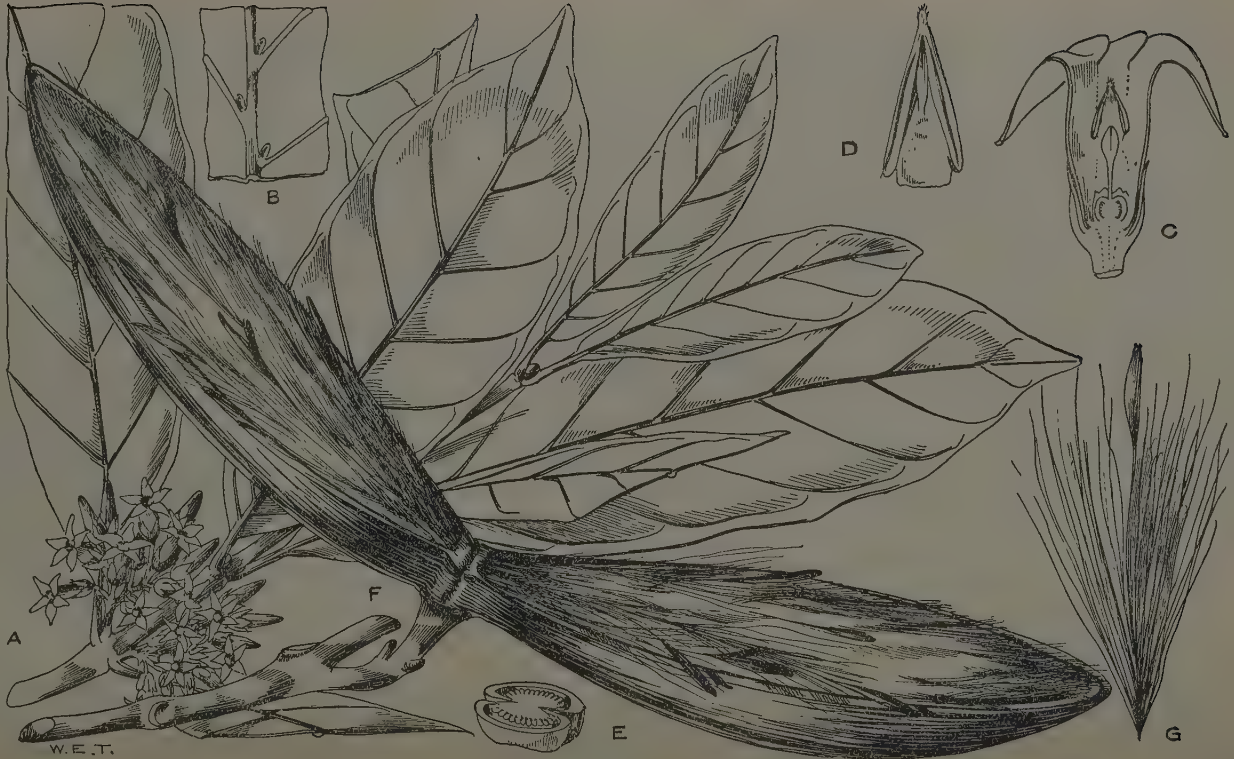


FIG. 192.—FUNTUMIA ELASTICA *Stapf* (APOCYNACEAE).
A, flowering shoot. B, part of under surface of leaf showing pits. C, longitudinal section of flower. D, anther. E, cross-section of ovary. F, fruit. G, seed.

2. **A. parciflora** *Stapf*—F.T.A. 4, 1 : 610 ; Stapf 632, t. 262. A glabrous climbing shrub with slender branches and few yellowish flowers ½ in. long with a red pubescent centre.
Liberia : Sino, Greenville ! Exsicc.—*Sim* 25.

3. **A. Whytei** *Stapf*—F.T.A. 4, 1 : 610 ; Stapf 632. A glabrous climbing shrub with rather large leaves and white (?) flowers, drying black, ½–¾ in. long, crowded in subsessile corymbs.
Liberia : Sino Basin ! Exsicc.—*Whyte*.

4. **A. Schumannii** *Stapf*—F.T.A. 4, 1 : 197. A glabrous woody climber with very abruptly acuminate leaves and white flowers ¾ in. long in dense corymbs.
S. Nigeria : Ukunzu (Jan.) ! Also in Cameroons and Gabon. Exsicc.—*N. W. Thomas* 2213.

5. **A. lucida** *Stapf*—F.T.A. 4, 1 : 198. *A. Giraudii* Dubard. A lofty woody climber with rather small flowers yellow with a red centre, in loose corymbs, and slender follicles 12–15 in. long.
Gold Coast : ? locality ! Amnafo (Apr.) ! Togo : ? locality (July) ! S. Nigeria : Nun R. (Sept.) ! Calabar R. (Feb.) ! Degema ! Oban ! Extends to Angola, and to Uganda and E. Africa. Exsicc.—*Mann* 491 ; 2245. *Talb.* 3643. *Debeaux* 389. *Giraud.*

6. **A. landolphioides** *K. Schum.*—F.T.A. 4, 1 : 197 ; Holl. 3 : 462 ; Chev. Bot. 423. A lofty woody climber with corymbs of strongly-scented flowers, white with red centre, and narrow follicles 9–12 in. long.
Fairly common from Casamance to S. Nigeria, and extending to Cameroons ! Exsicc.—*Heudelot* 626. *Barter* 1326 (partly) ; 2218. *Millson* 6. *Millen* 77 ; 173. *Irving* 145. *Sc. Elliot* 4676 ; 4809. *Johnson* 561 ; 895. *Farmar* 493. *Elliott* 33. *Warnecke* 110 ; 333. (See Appendix).

7. **A. Barteri** *Oliv.*—F.T.A. 4, 1 : 197, 610 ; Ic. Pl. t. 1992 ; Chev. Bot. 423. A woody climber with smooth branches and white fragrant flowers less than ½ in. long in lax corymbs, leaves pale below, and slender follicles 1 ft. or more long.
Fairly common from Ivory Coast to eastern S. Nigeria ! Exsicc.—*Barter* 1321. *Millson. Rowland. Millen* 132. *Punch* 19. *Johnson* 664, 915. *Talb.* 1294 ; 1674. (See Appendix).

## 22. **BAISSEA** A.DC.—F.T.A. 4, 1 : 203.

Leaves cordate, rounded or truncate at the base ; branchlets pubescent to tomentose :
Corolla 1 cm. long or more :
Leaves not cordate at the base :
Leaves tomentose or pubescent on the midrib or nerves below :
Leaves acuminate, broadly elliptic or oblong-elliptic, 5–8 cm. long, 3–5 cm. broad, tomentose on the nerves and in their axils ; inflorescence softly tomentose 1. *multiflora*
Leaves not acuminate, oblong, truncate at the base, 3–5 cm. long, 1·5–2 cm. broad, tomentose on the midrib and with tufts of hairs in their axils ; inflorescence very shortly pubescent .. .. .. .. .. .. 2. *aframensis*
Leaves glabrous on the nerves below, tomentose in their axils, elliptic or oblong-elliptic, shortly triangular-acuminate, 8–10 cm. long, 3–5 cm. broad, with numerous fine closely parallel tertiary nerves spreading from the midrib at right angles ; inflorescence shortly and softly pubescent .. .. .. 3. *caudiloba*
Leaves deeply cordate at the base, broadly triangular-acuminate, 6–10 cm. long, 2–3·5 cm. broad, tomentose on the nerves below ; inflorescence tomentose 4. *subsessilis*
Corolla 5 mm. long or less :
Leaves gradually and broadly acuminate, oblong or ovate, 2·5–5·5 cm. long, 1·5–2 cm. broad, pubescent on the nerves below and in their axils ; inflorescence pubescent, shorter than the leaves ; calyx-lobes about 2 mm. long .. 5. *breviloba*
Leaves rounded at the apex or at most with a broad triangular point, oblong and resembling leaflets of a pinnate leaf, 2·5–5 cm. long, 1·5–2 cm. broad, subsessile, long-pilose on the midrib below ; flowers very few in small cymes 6. *axillaris*
Leaves cuneate at the base :
Corolla-lobes linear, thread-like ; flowers rather numerous ; leaves oblong-elliptic, obtusely acuminate, 6–11 cm. long, 3–5 cm. broad, with numerous oblique tertiary nerves, glabrous below except in the axils of the nerves .. 7. *tenuiloba*
Corolla-lobes lanceolate to ovate :
Lateral nerves 8–12 pairs ; tertiary nerves numerous and oblique :
Corolla 5 mm. long ; leaves oblong-obovate, the older ones about 8 cm. long and 5 cm. broad, with conspicuous tufts of hairs in the axils of the lateral nerves below .. .. .. .. .. .. .. .. 8. *brachyantha*
Corolla 8–12 mm. long ; tertiary nerves numerous and very close, spreading ; leaves as in preceding .. .. .. .. .. .. .. 9. *leonensis*
Lateral nerves 5–6 pairs :
Corolla 1 cm. or more long, with lanceolate acuminate lobes :
Tertiary nerves faint and more or less parallel with the lateral nerves ; leaves gradually long-acuminate, elliptic-lanceolate, acutely cuneate at the base, 5–8 cm. long, 2–3 cm. broad, thin, glabrous ; pedicels slender, 0·5–1 cm. long 10. *odorata*
Tertiary nerves conspicuous and spreading from the midrib almost at a right angle ; leaves rather shortly acuminate, oblong-elliptic, 6–8 cm. long, 2·5–3·5 cm. broad, with tufts of hairs in the axils of the lateral nerves ; pedicels up to 5 mm. long .. .. .. .. .. .. .. .. 11. *laxiflora*
Corolla up to 1 cm. long, with broad not acuminate lobes :
Pedicels slender, about 8 mm. long ; leaves oblong-oblanceolate, shortly and obtusely pointed, 6–8 cm. long, 2·5–3 cm. broad, with spreading tertiary nerves 12. *concinna*

Pedicels stout, at most 3 mm. long ; leaves broadly obovate, rather long-acuminate, acutely cuneate at the base, 7–10 cm. long, 3·5–5 cm. broad, often villous in the axils of the lateral nerves below .. .. .. .. 13. *Lane-Poolei*

1. **Baissea multiflora** *A.DC.*—F.T.A. 4, 1 : 207 (excl. var. *caudiloba* Stapf), 611 ; Chev. Bot. 424. A lofty climber, usually rusty-pubescent, with copious slender panicles of white or pinkish flowers ¾ in. long ; and narrow, rusty-tomentose follicles 12–16 in. long.
   Senegal to French Guinea, common ! Exsicc.—*Dollinger* 45. *Heudelot* 186 ; 597 ; 601. *Brown-Lester* 14. *Sc. Elliot* 4807. *Dudgeon* 8. *Pobéguin* 242. (See Appendix).
2. **B. aframensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A climber with axillary panicles of white (turning yellow) flowers, ½ in. or more long.
   Gold Coast : Afram Plains (May) ! Aburi Hills (June) ! Exsicc.—*Kitson* 1140. *Patterson* 287.
3. **B. caudiloba** *Stapf* in Journ. Linn. Soc. 30 : 90. *B. multiflora* var. *caudiloba* Stapf—F.T.A. 4, 1 : 208. A woody climber with the habit of *B. multiflora*.
   French Guinea : ? locality ! Sierra Leone : several localities (Feb.–Apr.) ! Gold Coast : S. Ashanti, Jakobo (Mar.) ! Exsicc.—*Sc. Elliot* 4807. *Farmar* 319a. *Smythe* 260. *Burbridge* 491. *King-Church* 12. *Dawe* 433. *Deighton* 1095 ; 1150. *Chipp* 148. (See Appendix).
4. **B. subsessilis** *Stapf* ms. *Oncinotis subsessilis* K. Schum.—F.T.A. 4, 1 : 612. A rusty-tomentose climber more or less like the last but the leaves with a subcordate base.
   S. Nigeria : Ishagama (Mar.) ! Exsicc.—*Schlechter* 12310.
5. **B. breviloba** *Stapf* in Kew Bull. 1912 : 278. *B. ivorensis* A. Chev. A climbing shrub, rusty-pubescent, with comparatively narrow leaves.
   French Guinea : Nzerekore, 1,900 ft. (June) ! Ivory Coast : Agniéby Valley, Makougnié forest ! S. Nigeria : Ikpe (Apr.) ! Exsicc.—*Farquhar* 1. *Collenette* 34. *Chev.* 17191.
6. **B. axillaris** *Hua*—F.T.A. 4, 1 : 210, 611. A climbing shrub, fulvous-tomentose, with closely distichous rather narrow leaves, and small yellow flowers in short axillary cymes ; follicles subcylindric, obtuse, 8–9 in. long, brown-woolly pubescent.
   S. Nigeria : Lagos, Ikoyi (Mar.–Apr.) ! Yewa Mala (June) ! Ishoku (Oct.) ! Eket ! Calabar ! Johann-Albrechtshöhe ! Extends to Angola. Exsicc.—*Mann* 2301. *Punch* 77. *Dalz.* 1102. *Unwin* 148. *Talb.* 3317. *Staudt* 518. (See Appendix).

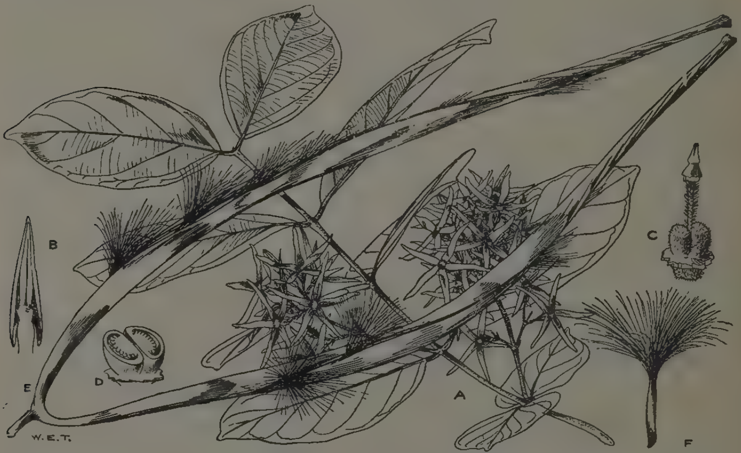


FIG. 193.—BAISSEA MULTIFLORA *A.DC.* (APOCYNACEAE).

A, flowering shoot. B, anther. C, pistil. D, cross-section of ovary. E, fruit. F, seed.

7. **B. tenuiloba** *Stapf*—F.T.A. 4, 1 : 214, 611. An erect or climbing shrub with slender branches, finely-rusty when young, and dark purple flowers ½–¾ in. long with tailed corolla lobes, in axillary and terminal panicles.
   S. Nigeria : Bonny (Feb., Oct.) ! Cameroons R. (Jan.) ! Extends to Congo and Uganda. Exsicc.—*Mann* 504 ; 2187. *Kalbreyer* 73.
8. **B. brachyantha** *Stapf*—F.T.A. 4, 1 : 213. A climbing shrub, finely-rusty when quite young, soon glabrous, with small white or yellowish flowers in short slender panicles.
   Sierra Leone : Bagroo R. (Apr.) ! Exsicc.—*Mann* 854.
9. **B. leonensis** *Benth.*—F.T.A. 4, 1 : 213 ; Chev. Bot. 424. A climbing shrub, dark-rusty when young, with panicles of white, red-streaked flowers ½ in. long, and slender follicles about 2 ft. long.
   French Guinea and Sierra Leone, fairly common ! Liberia : Grand Bassa ! Gold Coast : Akwapim, 1,400 ft. (Mar.) ! Aburi Hills (Nov.). S. Nigeria : Eket ! Oban ! Exsicc.—*Don.* *T. Vogel* 119. *Sc. Elliot* 5500. *Johnson* 283 ; 677 ; 1070. *Farmar* 419. *Talb.* 3324 ; 3326. *Dinklage.*
10. **B. odorata** *K. Schum.*—F.T.A. 4, 1 : 212 ; 611 ; Stapf 632. A climbing shrub with glabrous branches and copious panicles of white purple-streaked fragrant flowers, ¾ in. long.
    Liberia : Sino, Greenville ! S. Nigeria : Lagos, Ikoyi, in swamp forest (Mar.) ! Also in Cameroons. Exsicc.—*Sim* 32. *Dalz.* 1258. *Dawe* 433. *Deighton* 1095.
11. **B. laxiflora** *Stapf*—F.T.A. 4, 1 : 208. A climber with slender branches and white flowers about ½ in. long in short axillary and terminal panicles.
    S. Nigeria : Calabar (Feb.) ! Ubuluku (Jan.) ! Eket ! Oban ! Extend to Gabon. Exsicc.—*Mann* 2258. *Talb.* 3164. *N. W. Thomas* 2266.
12. **B. concinna** *Stapf*, ms. A climbing shrub.
    Liberia : Grand Bassa ! Exsicc.—*Dinklage* 1630.

13. **B. Lane-Poolei** *Stapf* in Kew Bull. 1915 : 46. A lofty climber, with a stout stem at the base and brown-puberulous branches and (white ?) flowers about ⅓ in. long in short axillary and terminal panicles.
Sierra Leone : York Pass (July) ! Sambaia (June) ! Exsicc.—*Lane-Poole* 322. *D. G. Thomas* T. 68.

## 23. ONCINOTIS Benth.—F.T.A. 4, 1 : 220.

Branchlets and lower surface of leaves (especially on the nerves) softly pilose-pubescent ; leaves obovate-elliptic, broadly acuminate, rounded at the base, 7–10 cm. long, 3–4·5 cm. broad, with about 5 pairs of lateral nerves ; inflorescence pilose all over ; calyx-lobes broadly lanceolate, 2 mm. long ; corolla beaked in bud, about 8 mm. long .. .. .. .. .. .. .. .. .. .. 1. *gracilis*

Branchlets and lower surface of leaves glabrous :

Lateral nerves of leaves about 6–9 pairs, looped rather far within the margin ; leaves oblong-elliptic, obtusely acuminate, shortly cuneate at the base, 8–12 cm. long, 3·5–6 cm. broad ; cymes about as long as the leaves, scurfy-pubescent all over ; calyx-lobes broadly oblong-elliptic, 3 mm. long ; corolla 8 mm. long, shortly pubescent 2. *campanulata*

Lateral nerves of leaves 12–15 pairs, looped very close to the margin :

Leaves very shortly and broadly cuneate at the base, oblong, with the lateral nerves rather distant, 9–12 cm. long, 4–5 cm. broad ; inflorescence rather few and laxly flowered .. .. .. .. .. .. .. .. .. 3. *Batesii*

Leaves narrowly and rather long-cuneate at the base, distinctly obovate, with the lateral nerves rather close, 6–8 cm. long, 2·5–4·5 cm. broad ; inflorescence rather densely flowered .. .. .. .. .. .. .. .. 4. *nitida*

1. **Oncinotis gracilis** *Stapf*—F.T.A. 4, 1 : 223, 612 ; Chev. Bot. 423. *O. chlorogena* K. Schum. A climbing shrub, pale-rusty-pubescent, with axillary panicles of fragrant yellowish flowers ¼ in. long, and narrow spindle-shaped follicles 6–7 in. long.
French Guinea : Faranna, at Niger sources (Jan.) ; Toma country (Feb.). Ivory Coast : several localities. Gold Coast : Kwahu (Apr., June) ! Akropong (Mar.) ! N. Nigeria : Lokoja (Mar.) ! S. Nigeria : Ilaro (Jan.) ! Igbessa ! Ikorodu (Mar.) ! Asaba ! Oban ! Also in Cameroons. Exsicc.—*Millen* 106 ; 189. *Johnson* 658 ; 902. *Shaw* 18. *Schlechter* 12996.

2. **O. campanulata** *K. Schum.*—F.T.A. 4, 1 : 222 ; Chev. Bot. 423. *O. glandulosa* Stapf. A woody climber, glabrous except on the inflorescence, with paniculate yellow fragrant flowers over ¼ in. long.
French Guinea : Guerzé country, between Moussadougou and Lola (Mar.) ! Gold Coast : Aburi (Apr.) ! S. Nigeria : Between Sapoba and Benin city ! Oban ! Also in Cameroons, Gabon and Uganda. Exsicc.—*Johnson* 1064. *Thompson* 20. *Talb.* 1692.

3. **O. Batesii** *Stapf*—F.T.A. 4, 1 : 221. A climbing shrub like the preceding.
Liberia: Peáhtah (Oct.) ! Gold Coast : Aburi (Apr.) ! S. Ashanti, between Adiembra and Domiabra (fr. June) ! S. Nigeria : Ala (Nov.) ! Also in Cameroons. Exsicc.—*N. W. Thomas* 1946. *Johnson* 883. *Linder* 903.

4. **O. nitida** *Benth.*—F.T.A. 4, 1 : 221, 612 ; Chev. Bot. 424. A climbing shrub with shining markedly nerved leaves, glabrous except the yellow flowers in short axillary panicles ; follicles 5–7 in. long, 1½ in. broad when fully opened out.
Sierra Leone : Freetown (June) ! Waterloo (July) ! Togo : near Lome ! S. Nigeria : Lagos, Ikoyi (June) ! Exsicc.—*T. Vogel* 63. *Dalz.* 1347. *Warnecke* 450. (See Appendix).

## 24. MOTANDRA A.DC.—F.T.A. 4, 1 : 224.

Branchlets softly tomentose ; leaves oblong-elliptic, triangular-acuminate, rounded at the base, 5–10 cm. long, 3–5 cm. broad, densely hirsute in the axils of the 4–5 pairs of lateral nerves below ; flowers in terminal oblong panicles softly tomentose all over ; corolla 8 mm. long, tomentellous ; fruiting carpels 12 cm. long, narrowly lanceolate, densely villous-tomentose ; seeds flat, 1·5 cm. long, margin thicker, with a long coma of silky hairs at the apex .. .. .. .. .. .. .. *guineensis*

**M. guineensis** *A.DC.*—F.T.A. 4, 1 : 224 ; Chev. Bot. 422. *M. rostrata* Schlecht. A climbing shrub, sometimes suberect, yellowish-tomentose on the branchlets, young leaves and inflorescence, with small whitish flowers pointed in bud in panicles 1–6 in. long, and follicles 4 in. long covered with dense woolly tomentum.
Fairly common from French Guinea to S. Nigeria, and extending to Cameroons and Congo. Exsicc.—*Barter* 1636 ; 3411. *Millson* 16. *Rowland.* *Millen* 114 ; 145. *Brown* 684. *Johnson* 630 ; 642. *Farmar* 487. *Thompson* 40. *Mildbraed* 7379. *Schlechter* 12312.

## 25. STROPHANTHUS DC.—F.T.A. 4, 1 : 167.

Corolla-lobes not tailed :

Leaves oblong or oblong-elliptic, acutely acuminate, rounded or shortly cuneate at the base, 7–15 cm. long, 5–8 cm. broad, glabrous, with 6–8 pairs of rather faint spreading lateral nerves, veins scarcely visible ; flowers several ; pedicels scarcely 1 cm. long ; calyx-lobes very broad and blunt, 1·5 cm. long ; corolla 5–6 cm. long, widened from the top of the calyx .. .. .. .. .. .. .. .. 1. *gratus*

Leaves oblanceolate to elliptic, acute, 8–12 cm. long, 3–5 cm. broad, glabrous, with about 6 pairs of lateral nerves ; flowers 1–4 ; pedicels 0·5 cm. long ; calyx-lobes 1·5 cm. long, acute ; appendages of anthers much exserted .. 2. *Thollonii*

Corolla-lobes produced into long narrow tails :

Branchlets and leaves pilose or hispid :

Very hispid ; tails of corolla-lobes about 6–8 times as long as the corolla, filiform ; leaves very rounded or subcordate at the base, abruptly acuminate, 8–15 cm. long, up to 8 cm. broad, thin ; corymbs many-flowered ; fruits up to 35 cm. long 3. *hispidus*

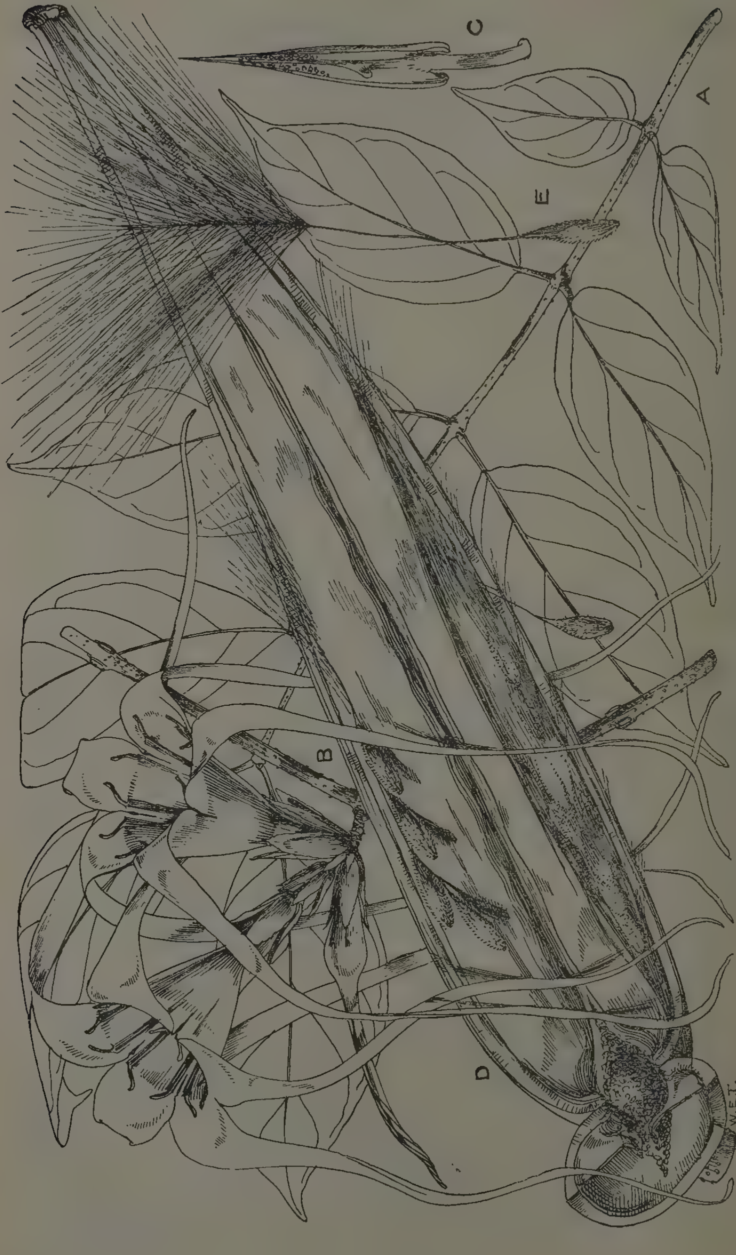


FIG. 194.—STROPHANTHUS SARMENTOSUS *A.P.DC.* (APOCYNACEAE).
A, leafy shoot. B, flowers. C, stamen. D, one valve of fruit from within. E, seed.

Thinly pilose ; tails of corolla-lobes a little longer than the corolla, linear ; leaves truncate to acute at the base, oblong-obovate, 10–18 cm. long, 3–6 cm. broad, thin, sparingly pilose ; corymbs few-flowered ; fruits up to 60 cm. long 4. *Bullenianus*

Branchlets and leaves glabrous or at most scabrid :

Tails of corolla not more than three times as long as the lobes, linear ; leaves elliptic, acuminate, rounded to a subacute base, 5–10 cm. long, 3–6 cm. broad, glabrous, with about 4 pairs of lateral nerves ; flowers few, at the ends of short lateral branchlets ; calyx-lobes broad and leafy, acute, about 1·5 cm. long ; fruits 20–30 cm. long .. .. .. .. .. .. .. 5. *sarmentosus*

Tails of corolla many times as long as the lobes, long and thread-like :

Branchlets and lower surface of leaves scabrid ; leaves elliptic, acuminate, 4–10 cm. long, 2·5–4·5 cm. broad, with about 4 pairs of lateral nerves ; flowers few ; calyx-lobes lanceolate, about 1·3 cm. long ; corolla-tails about 15 cm. long, tube 1·5 cm. long .. .. .. .. .. .. .. .. .. .. 6. *gracilis*

Branchlets and lower surface of leaves glabrous :

Sepals broad at the base ; corolla-tails very long .. .. .. 7. *Preussii*

Sepals narrow at the base ; corolla-tails up to 5 cm. long .. .. 8. *Barteri*

1. **Strophanthus gratus** *Franch.*—F.T.A. 4, 1 : 170, 604 ; Stapf 628, t. 219 ; Gilg in Engl. Monogr. Afr. Pflanz.—Fam. 7 : 17, t. ix. Chev. Bot. 420. *S. Perrotii* A. Chev. A glabrous woody climber with shining coriaceous leaves and terminal cymes of handsome red flowers (sometimes nearly white) 2 in. long.

Fairly common in forest from Sierra Leone to S. Nigeria, and extending to Cameroons and Gabon ! Exsicc.—*Whitfield*. *Rowland*. *Cummins* 44 ; 55. *Millen* 174. *Whyte*. *Talb.* 3062. *Chev.* 22569, (See Appendix).

2. **S. Thollonii** *Franch.*—F.T.A. 4, 1 : 171, 605 Gilg l.c. 19, t. ix., B. A glabrous climbing shrub in habit like the preceding, with flowers white and purple or pink fading to orange, nearly 2 in. long.

S. Nigeria : Oban ! Rio del Rey ! Cameroons R. (Jan.) ! Extending to Gabon. Exsicc.—*Mann* 743 ; 2222. *Johnston* 44. *Talb.* (no number).

3. **S. hispidus** *A.P.DC.*—F.T.A. 4, 1 : 174, 606 ; Gilg l.c. 35, t. ii. ; Holl. 3 : 448 ; Chev. Bot. 420. A shrub with long very hairy whip-like branches becoming a climber ; the flowers are yellow, purple-spotted in the throat with very long tails to the corolla ; the follicles are 12–18 in. long and more or less beaked.

From Senegal and French Sudan to Congo Basin, often planted as an arrow-poison plant ! Exsicc.—*Heudelot* 829. *Barter* 749 ; 2102 ; 3321. *Mann* 793 ; 2248. *Irving* 188. *Rowland*. *Thomson*. *Johnson* 549B. *Sc. Elliot* 5300. *Elliott* 233 ; 236. *Talb.* 1482. (See Appendix).

4. **S. Bullenianus** *Mast.*—F.T.A. 4, 1 : 175, 606 ; Gilg l.c. 38, t. iii., C. A climbing shrub thinly pilose on the young branches and leaves, the flowers yellow with purple spots and tails of the corolla-lobes up to 1 in. long ; follicles up to 21 in. long, tapering to a woody tip.

S. Nigeria : Calabar (Feb.) ! Oban ! Fernando Po ! Extends to Gabon. Exsicc.—*Mann* 1444 ; 2247 *Thomson* 22

5. **S. sarmentosus** *A.P.DC.*—F.T.A. 4, 1 : 180, 607 ; Stapf 630 ; Gilg l.c. 29 ; Holl. 3 : 450 ; Chev. Bot. 421. A glabrous shrub, scrambling in the open on rocks, etc., or a lofty woody climber in forest ravines ; the flowers fairly large, funnel-shaped, white with wine-red interior, turning yellow, the tails of the corolla-lobes 2-2½ in. long ; follicles 8–12 in. long, stout, not beaked.

Very common from Senegal and French Sudan to Lower Congo, also in Uganda ! (See Appendix).

6. **S. gracilis** *K. Schum.*—F.T.A. 4, 1 : 175, 606 ; Gilg l.c. 23, t. iv., B. A climbing shrub, with yellow or orange flowers having very long thread-like tails (up to 6 in.) to the corolla-lobes.

S. Nigeria : Brass ! Nun R. (Sept.) ! Bonny ! Eket ! Calabar ! Extending to Gabon. Exsicc.—*Barter* 1867 ; 2111. *Mann* 499. *Talb.* 3083. *Kalbreyer* 70.

7. **S. Preussii** *Engl. & Pax*—F.T.A. 4, 1 : 176, 606 ; Gilg l.c. 24, t. iv., A. ; Holl. 3 : 449 ; Chev. Bot. 421. A glabrous woody climber, with white flowers spotted and streaked in the throat, turning yellow, and with very long thread-like purple tails to the corolla reaching 1 ft. in length.

Fairly common from French Guinea to Cameroons and extending to Angola ! Exsicc.—*Barter* 3322. *Mann* 177. *Irving* 19. *Thomson* 9. *Monteiro* 73. *Rowland*. *Millen* 27. *Johnson* 150 ; 908. *Farmar* 382. *Talb.* 3834. *Imp. Inst.* 1110. *Baumann* 591A. (See Appendix).

8. **S. Barteri** *Franch.*—F.T.A. 4, 1 : 177, 607 ; Gilg l.c. 25 ; Holl. 3 : 446 ; Chev. Bot. 419. *S. minor* Christy ? A small scrambling or climbing shrub with rather slender glabrous branches, and yellowish flowers with brown-purple markings and filiform corolla-tails 2–3 in. long.

Ivory Coast : Dyola country, between Mt. Kouan and Danané ; between Man and Zagoué. Gold Coast : ? locality. Agogo, Ashanti ! S. Nigeria : Lagos, Ikoyi (Apr.) ! Abeokuta ! Lagos Colony ! Exsicc.—*Barter* 3346. *Rowland*. *Farmar* 383. *Dalz.* 1106. *Vigne* 1083. (See Appendix).

## 26. MALOUETIA A.DC.—F.T.A. 4, 1 : 194.

Branchlets purplish, glabrous ; leaves elliptic-obovate, acutely acuminate, unequally cuneate at the base, 9–14 cm. long, 4–6 cm. broad, glabrous, with about 8 pairs of lateral nerves ; flowers few in subsessile cymes ; pedicels 1 cm. long ; calyx-lobes lanceolate, 2·5 mm. long ; corolla-tube nearly 1·5 cm. long, lobes 1 cm. long ; anthers partly exserted ; fruiting carpels divergent, slightly curved, about 22 cm. long ; seeds linear-lanceolate, not comose .. .. .. .. .. .. *Heudelotii*

**M. Heudelotii** *A.DC.*—F.T.A. 4, 1 : 195, 609 ; Chev. Bot. 419. A shrub, glabrous with purple-brown branchlets, white or pinkish flowers nearly 1 in. long, and long slender fruit follicles in pairs.

Senegal ! French Guinea : between the Santa and Timbo ; Futa-Jallon, between Ditinn and Diaguissa ; between Ymbo and Orobé. Sierra Leone : Scarcies R. near Sasseni (fl. and fr. Jan.) ! Bayabaya ! Pujehun (May) ! Port Lokko (Dec.) ! Magbile (Dec.) ! Yonibana (Oct.) ! Also in Congo basin. Exsicc.—*Heudelot* 714 ; 890. *Sc. Elliot* 4242 ; 4430 ; 4524 ; 4626 ; 4782 ; 4785 ; 5566. *Smythe* 25. *Dawe* 497. *Deighton* 661.

## 27. ISONEMA R.Br.—F.T.A. 4, 1 : 187.

Leaves glabrous below, elliptic, triangular-acuminate, about 7 cm. long and 4 cm. broad, with about 5 pairs of lateral nerves, laxly reticulate below ; panicles lax, with long spreading branches, minutely puberulous ; calyx 2·5 mm. long, puberulous ; corolla 1·5 cm. long, anthers a little exserted .. .. .. 1. *Buchholzii*

Leaves softly pubescent below especially on the nerves, subacute at the apex, rounded or slightly cordate at the base, 6–9 cm. long, 3·5–4·5 cm. broad, with about 7 pairs of lateral nerves; panicles narrowly oblong, with very short branchlets, hirsute; calyx 3 mm. long, pubescent; corolla nearly 2 cm. long, very shortly pubescent outside; anthers wholly exserted; fruiting carpels widely divergent, about 16 cm. long, velvety-tomentose; seeds 1·5 cm. long, and a coma of long soft hairs at each end, the longer 5 cm. long .. .. .. .. .. .. 2. *Smeathmannii*

1. **Isonema Buchholzii** *Engl.*—F.T.A. 4, 1 : 189. A woody climber with dark brown glabrous branches and rather narrow tubular red (or white ?) flowers in lax panicles.
S. Nigeria: Eket! Johann-Albrechtshöhe! Cameroons R. (Jan.)! Exsicc.—*Mann* 744; 2211. *Talb.* 3027. *Staudt* 481.

2. **I. Smeathmannii** *Roem. & Schultes*—F.T.A. 4, 1 : 188, 609; Stapf 630; Chev. Bot. 419. A climbing shrub, yellow or rusty-tomentose, with stiff narrow panicles of flowers reddish-yellow outside but wine-red in the tube when fresh, and narrow follicles 6–8 in. long, yellow-brown tomentose.
From Senegal and Sierra Leone to western part of Gold Coast! Exsicc.—*Heudelot* 912. *T. Vogel* 65. *Mann* 824. *Burton.* *Sc.Elliot* 4305; 5814. *Millen* 199. *Whyte.* *Farmar* 370. *Hunter* 49. (See Appendix).

## 122. ASCLEPIADACEAE

Perennial herbs, undershrubs or shrubs, sometimes climbers. Leaves opposite or verticillate, very rarely alternate; simple; stipules absent. Inflorescence mostly cymose, often corymbose or subumbellate. Flowers actinomorphic, hermaphrodite. Calyx-lobes imbricate or open in bud. Corolla 5-lobed, lobes contorted or valvate. Corona simple or of 5 or more scales, either adnate to the corolla-tube or to the stamens or to both. Stamens 5, mostly inserted at the base of the corolla; filaments separate or connate into a tube; anthers connivent around the stigma and often adnate to it, 2-celled; pollen granular or in glutinous masses. Disk absent. Ovary of 2 free carpels, superior; styles 2, separate, but united at the apex in a single stigma, the latter often thick and disk-like; ovules mostly numerous, pendulous in several series. Fruit of 2 usually divergent follicles. Seeds often crowned by a beard of long silky hairs; endosperm thin.

Mostly in the warmer regions, very numerous in South Africa. Determined at once by the presence of a corona and the usually glutinous pollen masses.

### *Key to the Tribes.*

Filaments of the stamens free; pollen granular, granules composed of 4 pollen grains united in tetrads; anthers with connectives produced beyond the cells
I. Periploceae
Filaments of the stamens connate into a tube; anthers adnate to the top of the dilated part of the style; pollen grains united into 2 or 4 waxy masses:
Pollen-contents of each anther-cell consisting of two distinct but exceedingly minute waxy masses, or the two masses loosely united into one but easily separable; style mostly produced beyond the dilated portion and beyond the anthers
II. Secamoneae
Pollen-contents of each anther-cell united into one waxy mass; style not produced beyond the anthers:
Pollen-masses opaque, without a pellucid margin:
Pollen-masses pendulous in the anther-cells
III. Cynancheae
Pollen-masses erect, horizontal or ascending, never pendulous
IV. Marsdenieae
Pollen masses with a pellucid margin or apex:
Leafy plants or if leafless then not fleshy; stems often climbing
V. Ceropegieae
Leafless or nearly so; stems fleshy, angular, dwarf, tubercular or toothed on the angles
VI. Stapelieae

### Tribe I.—Periploceae

Corolla-tube a mere ring, the lobes almost free, or corolla rotate, with a tube less than 2 mm. long; erect or twining shrubs:
Corona in a single series, lobes simple or divided:
Anthers glabrous; style conical at the apex:
Leaves stipulate; corona annular, with 5 minute lobules .. 1. **Batesanthus**
Leaves exstipulate, or stipules reduced to a mere line connecting the bases of the petioles; corona lobes long, filiform, simple or divided above into 2–3 filiform segments .. .. .. .. .. .. .. .. 2. **Tacazzea**
Anthers more or less hairy; style convex or subtruncate at the apex 3. **Periploca**
Corona double, spreading; corolla rotate .. .. .. .. 4. **Omphalogonus**

Corolla-tube distinctly campanulate or cylindrical :

Twining or erect shrubs ; corona simple, the lobes arising above the insertion of the stamens, but sometimes decurrent down to them ; stamens inserted towards the base of the campanulate corolla-tube .. .. .. .. 5. **Cryptolepis**

Herbs with a tuberous rootstock ; corona-lobes entire, bifid or trifid, inserted at or upon the base of the staminal filaments ; stamens inserted above the middle or at the mouth of the corolla-tube .. .. .. .. .. 6. **Raphionacme**

### Tribe II.—SECAMONEAE

Exserted part of the style forming a beak ; coronal lobes dorsally flattened ; pollen masses apparently 2 to each pollen carrier, but each of 2 united masses 7. **Toxocarpus**

Exserted part of the style obtuse, truncate, or bilobed ; coronal lobes laterally flattened or subulate ; pollen masses distinctly 4 to each pollen carrier 8. **Secamone**

### Tribe III.—CYNANCHEAE

Leafy twiners, erect shrubs or herbs :

Climbing plants :

Corona in one series :

Flowers small, numerous :

Corona-lobes dorsally flattened .. .. .. .. .. 9. **Cynanchum**

Corona-lobes laterally flattened .. .. .. .. .. 10. **Pentatropis**

Flowers about 3 cm. diam., few (2–4) in each inflorescence .. 11. **Oxystelma**

Corona in two series ; inner corona-lobes spurred at the base .. 12. **Pergularia**

Erect shrubs or herbs :

Flowers racemose (the pedicels arising from different points on the rhachis) 13. **Kanahia**

Flowers cymose :

Cymes lax, 2–6 flowered .. .. .. .. .. .. 14. **Glossonema**

Cymes densely many-flowered .. .. .. .. .. 15. **Solenostemma**

Flowers umbellate (all arising from about the same point) :

Corona-lobes spurred at the base .. .. .. .. .. 16. **Calotropis**

Corona-lobes not spurred :

Corona-lobes not petal-like :

Corona-lobes cucullate, or more or less complicate or cleft on the inner face, laterally compressed, with or without a horn or other process in the cavity, never dorsally flattened .. .. .. .. .. 17. **Asclepias**

Corona-lobes dorsally flattened, or if concave or with incurved edges, then always broader than they measure from front to back, usually with two slight or wing-like parallel keels and with or without one or more horns or other processes on the inner face, never laterally compressed, or with a single median keel 18. **Schizoglossum**

Corona-lobes very thick or laterally compressed, with or without teeth or keels on the inner face, or, if dorsally flattened, still comparatively thick and without keels, or with only one stout longitudinal median keel, but no filiform horn-like or other process on the inner face, solid .. .. 19. **Xysmalobium**

Corona-lobes petal-like, coloured .. .. .. .. .. 20. **Margaretta**

Leafless shrubs, small trees, or trailers .. .. .. .. 21. **Sarcostemma**

### Tribe IV.—MARSDENIEAE

Stems climbing :

Corona in a single series :

Corona arising from the corolla-tube .. .. .. .. 22. **Gymnema**

Corona arising from the staminal column :

Corolla subrotate ; corona of 5 small or minute tubercles, entirely adnate to the staminal column .. .. .. .. .. .. .. 23. **Tylophora**

Corolla campanulate, or the tube inflated at the base ; corona-lobes free at the apex :

Corona-lobes with a process on the inner face of the free apical part 24. **Telosma**

Corona-lobes without a process on the inner face of the free apical part 25. **Marsdenia**

Corona double, the inner series arising from the staminal column, the outer from the corolla .. .. .. .. .. .. .. .. .. 26. **Anisopus**

Stems not climbing ; shrub .. .. .. .. .. .. 27. **Dalzielia**

Stems erect, herbaceous, from a woody rhizome :

Corolla globose or globose-campanulate, lobes shorter than the tube 28. **Sphaerocodon**

Corolla subrotate, lobes longer than the tube .. .. .. 23. **Tylophora**

### Tribe V.—CEROPEGIEAE

Corolla-tube elongated, much longer than broad ; corona double ; flowers sometimes solitary but usually 2—many in lateral or terminal cymose umbels or rarely simply racemose, or with the peduncle bearing scattered 2–3-flowered fascicles 29. **Ceropegia**

Corolla-tube short and not longer than broad, or corolla rotate or subrotate :

Corona inserted on the corolla, the 5 lobes with hairy tips, and sometimes with an inconspicuous fleshy ring (inner corona) at the base of the staminal column ; flowers in umbels, lateral ; leaves sometimes absent .. .. .. 30. **Leptadenia**

Corona double, inserted on the staminal column, none on the corolla ; flowers 1–4 at the nodes, or many in a terminal umbel .. .. .. 31. **Brachystelma**

### Tribe VI.—Stapelieae

Only genus .. .. .. .. .. .. .. .. 32. **Caralluma**

### 1. BATESANTHUS N.E.Br.—F.T.A. 4, 1 : 253.

Climber ; leaves glabrous, elliptic to oblong-obovate, abruptly acuminate at the apex, cordate at the base, 7–16 cm. long, 4–10 cm. broad ; petioles 2 cm. long ; stipules interpetiolar, reflexed, leathery, subpersistent ; flowers in lax axillary panicles ; calyx small ; corolla rotate, lobes ovate, about 7 mm. long ; fruits 8–9 cm. long, 2 cm. broad .. .. .. .. .. .. .. .. .. *Talbotii*

**B. Talbotii** *S. Moore* in Cat. Talb. Nig. Pl. 63, incl. var. *B. purpureus* var. *parviflora* S. Moore. A climbing shrub with panicles of purple flowers and warted stems.
S. Nigeria : Oban ! Eket ! Exsicc.—*Talbot* 63 ; 2021.

### 2. TACAZZEA Decne.—F.T.A. 4, 1 : 260.

Leaves glabrous below, oblong, obtuse, subcordate at the base, 4–7·5 cm. long, 1·3–4 cm. broad ; panicles up to 7 cm. long, pubescent at the base of the peduncle ; bracts ovate, glabrous ; sepals 1·5 mm. long, ovate ; corolla-lobes 6–7 mm. long ; fruits 5 cm. long, lanceolate, tapered to a point .. .. .. .. .. 1. *Barteri*

Leaves pubescent or tomentose below :

Calyx glabrous ; leaves obtuse at the base, oblong, acuminate, 6–8 cm. long, about 2 cm. broad, shortly pubescent below .. .. .. .. 2. *nigritana*

Calyx minutely pubescent at the base ; leaves rounded or cordate at the base, varying from oblong to ovate, whitish tomentose below .. 3. *apiculata* var. *benedicta*

Calyx pubescent all over ; leaves as above, broadly ovate, the larger 8 cm. long and 6 cm. broad, minutely pubescent on the nerves below .. .. .. 4. *viridis*

1. **Tacazzea Barteri** *Baill.*—F.T.A. 4, 1 : 266 ; Chev. Bot. 429. A twining undershrub with pubescent stems, milky juice and yellow or greenish flowers ¼ in. long in axillary panicles.
French Sudan : Goundam marsh (Oct.) ! Mossi, Gampela (Aug.) ! Dahomey : Atacora Mts., Somba country, 900–1,800 ft., Tanguéta (June) ! N. Nigeria : Nupe ! Lemme (May) ! Exsicc.—*Barter* 1086. *Lely* 152.
2. **T. nigritana** *N.E.Br.*—F.T.A. 4, 1 : 265. A twining undershrub with stems slightly pilose becoming glabrous, with flowers like the last in loose panicles 3–4 in. long.
N. Nigeria : Abinsi, on trees (June) ! S. Nigeria : Abo ! Exsicc.—*Barter* 486. *Dalz.* 691.
3. **T. apiculata** var. **benedicta** *Sc. Elliot*—F.T.A. 4, 1 : 267 ; Chev. Bot. 429. A twining undershrub light brown-tomentose on the stems, with yellow-green sometimes purple-tinged flowers ¼ in. long in lax axillary panicles 2–4 in. long.
French Guinea : Sulimania, Dantilia (Mar.) ! Futa-Jallon, Kouria. Sierra Leone : Rowalla (July). Ivory Coast : Soubré, Sassandra R. (June) ; Mankono, between Buandougou and Marabadiassa (July). Gold Coast : Kumasi (May) ! N. Nigeria : Zungeru (July) ! Sokoto Prov., common (May) ! Bauchi Plateaur Tilde Fulani, 3,300 ft. (May) ! Also in Shari-Chad and Cameroons. Exsicc.—*Sc. Elliot* 5269. *Dalz.* 5 ; 525. *N. W. Thomas* 1061. *Vigne* 1709. *Lely* 231. (See Appendix).
4. **T. viridis** *A. Chev.* Bot. 429, name only. A climber or twiner, more or less pubescent.
Ivory Coast : Mankono, between Dialakoro and Kénégoué (July) ! Baoulé-Nord, between Marabadiassa and Gottoro (July) ! Exsicc.—*Chev.* 21975 ; 22025.

### 3. PERIPLOCA Linn.—F.T.A. 4, 1 : 256.

Leaves oblong to broadly oblong-elliptic, caudate-acuminate, rounded to subcordate at the base, 7–15 cm. long, 3–7 cm. broad, glabrous, glaucous below ; flowers in axillary panicles ; pedicels 6–10 mm. long, glabrous ; sepals broadly ovate, 3 mm. long ; corolla rotate, the lobes ovate-triangular, 8–10 mm. long, reflexed ; fruits up to 45 cm. long, lanceolate, striate, blackish when dry .. .. .. *nigrescens*

**P. nigrescens** *Afzel.*—F.T.A. 4, 1 : 258 ; Stapf 632 ; Chev. Bot. 430. A slender twining glabrous shrub with blackish flowers red to chocolate inside, and fruits 8 in. to over 1 ft. long and 1 in. broad before opening.
French Guinea : Kindia (Mar.) ; Mamou (May) ; between the Kaba and the Upper Mamou (May). Sierra Leone : several localities ! Liberia : Sino Basin ! Dukwia R. (May) ! Ivory Coast : Alépé (Feb.–Mar.). Gold Coast : Ancobra Junction (Jan.) ! ? locality ! Togo : Lome ! S. Nigeria : Calabar ! Degema (Sept.) ! Ikumin (Jan.) ! Extends to Angola and Ubangi-Shari. Exsicc.—*Barter* (no number). *Mann* 845. *Thomson* 43. *Sc. Elliot* 4206 ; 5631. *Holl.* 127 ; 261. *Whyte*. *Miles* 6. *Kitson* 1079. *G. P. Cooper* 453. *Warnecke* 216.

### 4. OMPHALOGONUS Baill.—F.T.A. 4, 1 : 256.

A twiner ; stems turning blackish, glabrous ; leaves paired or in threes, very broadly ovate-elliptic, cordate or truncate at the base, abruptly acuminate, 10–15 cm. long, 4–11 cm. broad, glabrous, often blackish above when dry ; lateral nerves 8–10 pairs, spreading ; petiole up to 5 cm. long ; cymes axillary, few-flowered ; bracts ovate, small ; calyx-lobes broadly ovate, about 3 mm. long ; corolla widely campanulate, about 1·4 cm. long, lobed to the middle ; corona double, lobes bilobulate *nigritanus*

**Omphalogonus nigritanus** *N.E. Br.* in Kew Bull. 1912 : 279 ; Holl. 3 : 462. *O. calophyllus* Chev. Bot. 430, not of Baill. Leaves pale glaucous beneath ; flowers deep red outside, violet-brown inside with yellow throat ; pods 4–6 in. long.

French Guinea : forest at Massadou, 20 miles south of Macenta, 1,600 ft. (May) ! Ivory Coast : various localities ! Gold Coast : Aburi ! N. Nigeria : Kontagora (Dec.) ! S. Nigeria : Olokomeji ! Abeokuta ! Exsicc.—*Collenette* 26. *N. W. Thomas* 1011. *Dalz.* 50. *Chev.* 16432, etc. (See Appendix).

## 5. **CRYPTOLEPIS** R.Br.—F.T.A. 4, 1 : 242.

Leaves elliptic or oblong-elliptic, acutely acuminate, acute to rounded at the base, 2·5–7 cm. long, 1–3 cm. broad, glabrous ; cymes terminal on short lateral shoots, laxly few-flowered ; pedicels 6–12 mm. long ; corolla-tube 5 mm. long, lobes overlapping to the left in bud, 1·2 cm. long ; fruits linear, about 18 cm. long ; seeds 1·2 cm. long, with a coma of long silky hairs .. .. .. 1. *sanguinolenta*

Leaves linear to linear-lanceolate, acute or acuminate, 4–10 cm. long, 3–12 mm. broad, glabrous ; cymes axillary, subsessile, many-flowered ; pedicels 2–4 mm. long ; corolla-tube 2–3 mm. long, lobes 3–3·5 mm. long ; fruits lanceolate-linear, about 7 cm. long .. .. .. .. .. .. .. .. 2. *nigritana*

1. **C. sanguinolenta** *Schltr.* West Afr. Kautschuk-Exped. 308. *C. triangularis* N.E.Br.—F.T.A. 4, 1 : 245 ; Chev. Bot. : 428. *C. Barteri* K. Schum. *Pergularia sanguinolenta* Lindl. in Bot. Mag. t. 2532. A glabrous twiner with yellow flowers ½ in. or more long with twisted corolla-lobes, and narrow fruits 6–8 in. long.

Gambia. French Guinea : Futa-Jallon and Diaguissa Plateau, several localities. Sierra Leone : ? locality (cultivated specimen) ! Near Lumbaraya (Feb.) ! Gold Coast : Aburi Hills (June) ! N. Nigeria : Nupe ! Dinyadi, Sokoto Prov. (fr. Dec.) ! S. Nigeria : Abeokuta ! Lagos Colony ! Also in Angola. Exsicc.—*Don. Barter* 1333 ; 3359. *Sc. Elliot* 5013. *Rowland. Moiser. Lloyd Williams* 289.

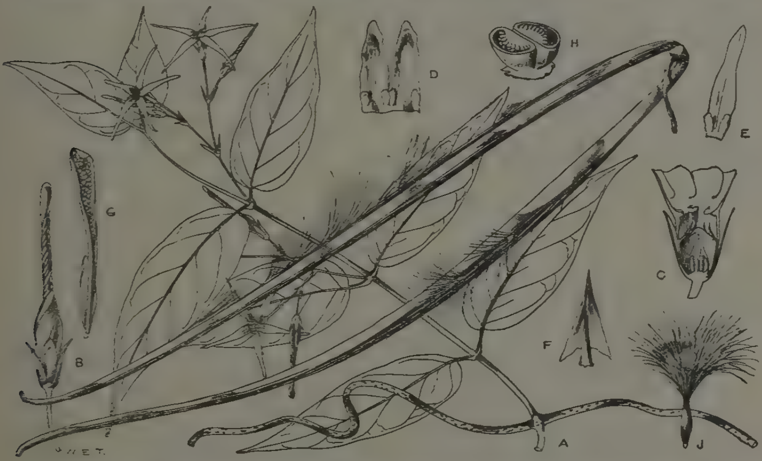


Fig. 195.—Cryptolepis sanguinolenta Schltr. (Asclepiadaceae).

A, flowering shoot. B, flower-bud. C, longitudinal section of lower part of flower. D, corona-lobes. E, corona-lobe. F, appendage. G. carpel, inverted. H, cross-section of ovary. Unlettered, fruit.

2. **C. nigritana** *N.E.Br.*—F.T.A. 4, 1 : 251 ; Chev. Bot. 428. A stiff-branched shrub 2–4 ft. high, glabrous but roughish on the stems, with small yellow flowers and fruits about 3–4 in. long.

Common in grass-savannah from French Sudan and French Guinea to N. Nigeria ! Distributed throughout tropical Africa. Exsicc.—*Barter* 1324. *Dalz.* 7 ; 46. *Pobéguin* 352. *Buettner* 401. (See Appendix).

## 6. **RAPHIONACME** Harv.—F.T.A. 4, 1 : 268.

Corolla-lobes 4–5 cm. long, oblong-lanceolate ; stems from a tuberous rootstock, minutely puberulous ; leaves sessile, linear-filiform, 1·2–3 cm. long, about 1·5 mm. broad, glabrous ; inflorescence terminal, lax, cymose, puberulous ; pedicels 8–14 mm. long, slender ; corolla-tube campanulate, 3 mm. long ; fruits linear, erect, about 15 cm. long, about 5 mm. thick, minutely puberulous .. .. .. 1. *Brownii*

Corolla-lobes 8–10 mm. long, broadly linear ; flowers few in a lax puberulous cyme ; leaves and fruits not seen .. .. .. .. .. .. .. 2. *sudanica*

1. **R. Brownii** *Scott Elliot*—F.T.A. 4, 1 : 273 ; Chev. Bot. 429 (incl. var. *longifolia* A. Chev.). *R. Browneana* Schlechter (sphal.). Erect branched herb 6–15 in. high, appearing after bush-fires and flowering usually before the leaves ; flowers pink or reddish-purple ½ in. long ; tuber edible.

French Sudan : Gourma, Konkobiri (July) ; Diapaga-Fada (July) ; Mossi, Ouagadougou to Ouahigouya (Aug.). French Guinea : Futa-Jallon, plateaux, common ! Sierra Leone : Falaba, on rocks (Mar.) ! Gold Coast : W. Ashanti, Sunyani (Jan.) ! Togo : Quamikrum. Dahomey : Kouandé (June). N. Nigeria : Lokoja (Mar.) ! Zaria (Feb.) ! Exsicc.—*Sc. Elliot* 5179. *Dalz.* 6 ; 396. *Chipp* 76. *Collenette* 2. (See Appendix).

2. **R. sudanica** *A. Chev.* Bot. 430, name only. Flowers reddish.
French Sudan : Diaragouéla, in the bush (Feb.) ! Exsicc.—*Chev.* 469.

### 7. **TOXOCARPUS** Wight & Arn.—F.T.A. 4, 1 : 286.

Flowers in racemes ; racemes axillary, up to 15 cm. long ; leaves oblong, cuspidate-acuminate, more or less rounded at the base, 6–10 cm. long, 2·5–4 cm. broad, leathery ; lateral nerves spreading, parallel, straight ; sepals 2 mm. long, minutely ciliate ; corolla 1·2 cm. diam., the tube 4 mm. long .. .. .. 1. *racemosus*

Flowers in short cymes ; cymes subsessile, rusty-pubescent ; leaves oblong or oblong-lanceolate, apiculate, cuneate at the base, glabrous, often black above when dry ; sepals 2–2·5 mm. long, subacute ; corolla 1–1·2 cm. diam., the tube very short 2. *brevipes*

1. **T. racemosus** *N.E.Br.*—F.T.A. 4, 1 : 287. A glabrous twiner with very faintly nerved leaves, and (white ?) flowers ½ in. across when open.
Cameroons Mt., 4,500 ft. (Feb.) ! Exsicc.—*Mann* 1273.

2. **T. brevipes** *N.E.Br.*—F.T.A. 4, 1 : 287. A twiner with reflexed rusty hairs on the branchlets, milky juice and white flowers, turning yellow, about ½ in. diameter.
S. Nigeria : Ikoyi (Aug., Dec.) ! Lagos Colony ! Akassa (Sept.) ! Eket ! Extends to Cameroons. Exsicc.—*Barter* 2120. *Mann* 484. *Millen* 64. *Dalz.* 931 ; 1105. *Talb.* 3031.

### 8. **SECAMONE** R.Br.—F.T.A. 4, 1 : 276.

Style not protruding beyond the anthers ; leaves more or less oblong, acute or acuminate, more or less rounded at the base, 3–6 cm. long, 1·2–3 cm. broad, glabrous ; cymes numerous, arranged in panicles ; corolla 2–3 mm. diam., glabrous 1. *myrtifolia*

Style protruding beyond the anthers ; leaves ovate, acute, rounded to a cuneate base, 2·5–4 cm. long, 1–1·8 cm. broad, glabrous ; cymes minutely puberulous ; corolla 5–6 mm. diam., glabrous .. .. .. .. .. .. 2. *leonensis*

1. **S. myrtifolia** *Benth.* F.T.A. 4, 1 : 280 ; Chev. Bot. 431. A glabrous twining shrub with milky sap and small greenish-yellow flowers.
Common from Senegal to S. Nigeria ! Extends to Gabon. Exsicc.—*Thierry* 58. *T. Vogel* 29. *Irving* 12. *Millen* 51 ; 121. *Johnson* 442 ; 1076 ; 1077. *Warnecke* 203. (See Appendix).

2. **S. leonensis** *N.E.Br.*—F.T.A. 4, 1 : 281 ; Chev. Bot. 431. Habit of the preceding, slightly hairy in the leaf-axils.
Sierra Leone : Sugar Loaf Mt. (Apr.) ! Ivory Coast : Baoulé-Nord, Kodiokoffi (Aug.) ! Exsicc.—*Sc Elliot* 5773. *Chev.* 22362.

### 9. **CYNANCHUM** Linn.—F.T.A. 4, 1 : 390.

Cymes pedunculate :

Pedicels about 1·5 cm. long ; sepals ovate-triangular, shortly ciliate, 2 mm. long ; corolla very obtuse in bud, 6 mm. long ; leaves ovate, acuminate, deeply cordate at the base, 7–12 cm. long, 5–7 cm. broad, minutely pubescent on the nerves below ; fruit acute at both ends, 10–11 cm. long .. .. .. .. .. 1. *longipes*

Pedicels at most 6 mm. long, shortly pubescent ; sepals ovate, minutely pubescent on the margin ; corolla 4 mm. long ; leaves ovate-elliptic, broadly acuminate, deeply cordate, 6–8 cm. long, 3–4 cm. broad, glabrous .. .. .. 2. *Mannii*

Cymes sessile or subsessile, several-flowered ; pedicels about 6 mm. long, puberulous ; leaves ovate, subauriculate-cordate at the base, broadly acuminate, 5–7 cm. long, 3–4·5 cm. broad, prominently 5-nerved at the base ; corolla acute in bud, 3·5 mm. long .. .. .. .. .. .. .. .. .. 3. *Adalinae*

1. **C. longipes** *N.E.Br.*—F.T.A. 4, 1 : 393. A nearly glabrous twiner (stems pubescent along one line) with white flowers in umbel-like cymes, and spindle-shaped fruits.
Sierra Leone : Ronietta (Nov.) ! Mamaha (Nov.) ! S. Nigeria : Papalayito ! Lagos Colony, 70 miles east of Lagos ! Exsicc.—*Millen* 48. *N. W. Thomas* 4553 ; 5377. *Lamborn* 303.

2. **C. Mannii** *N.E.Br.*—F.T.A. 4, 1 : 394. *C. Adalinae* Chev. Bot. 434, incl. var. not of K. Schum., A slender twiner, the stems with one lateral pubescent line, with greenish-white flowers smaller than the last and on longer peduncles.
Sierra Leone : Bagroo R. ! Port Lokko (Apr.) ! Kabusa, Limba (Apr.) ! Binkolo (Aug.) ! S. Prov., Vevehun (Apr.) ! Ivory Coast : several localities ! Exsicc.—*Mann* (no number). *Sc. Elliot* 5479 ; 5672. *N. W. Thomas* 1816. *Deighton* 1649. *Chev.* 16411 ; 17457 ; 19038 ; 19154 ; 21251 ; 21337.

3. **C. Adalinae** *K. Schum.*—F.T.A. 4, 1 : 394. *C. hastifolium* A. Chev. Bot. 435, not of N.E.Br. *C. macinense* A. Chev. Bot. 435. A twiner with small cream-white flowers in umbel-like cymes, sessile or very shortly pedunculate.
French Sudan : Mossi (Aug.) ! Macina (Sept.) ! S. Nigeria : Oban ! Ambas Bay (Feb.) ! Cameroons Mt., lower forest (Jan.) ! Fernando Po ! Also in French Cameroons and Gabon. Exsicc.—*Mann* 765. *Kalbreyer* 3. *Chev.* 24711 ; 24861.

### 10. **PENTATROPIS** R.Br.—F.T.A. 4, 1 : 380.

Stems twining, wiry, glabrous ; leaves ovate, slightly cordate at the base, very acute, 2·5–4 cm. long, 1–2 cm. broad, glabrous ; flowers 1–2 on a very short peduncle ; pedicels very slender, about 1 cm. long ; sepals ovate, very small ; corolla deeply 5-lobed, nearly 1 cm. long, lobes lanceolate, shortly pubescent inside
*cynanchoides* var. *senegalensis*

**P. cynanchoides** *R.Br.* var. **senegalensis** *N.E.Br.*—F.T.A. 4, 1 : 380. A slender twiner with yellowish viscid latex, half-succulent pale-green leaves pubescent only in the axils and petioles, with greenish-yellow flowers ½ in. long.
Senegal : moist places by the river ! N. Nigeria : Katagum, rare (Aug.) ! Exsicc.—*Roger*. *Heudelot* 530. *Dalz.* 94.

### 11. **OXYSTELMA** R.Br.—F.T.A. 4, 1 : 382.

Twiner ; stems wiry, glabrous ; leaves oblong-lanceolate, rounded or truncate at the base, subcordate, mucronate, 4–7 cm. long, 1·5–3 cm. broad, glabrous ; cymes 2–4-flowered ; pedicels slender, about 1 cm. long ; sepals lanceolate, 4 mm. long, glabrous ; corolla 3 cm. diam., 5-lobed, lobes triangular, ciliate along the sinus, veined with dark purple inside ; fruits about 5 cm. long, obliquely ellipsoid, glabrous ; seeds ovate, 4–5 mm. long, brown .. .. .. .. .. .. *bornouense*

**O. bornouense** *R.Br.*—F.T.A. 4, 1 : 383 ; Chev. Bot. 432 (incl. var. *lancifolia* A. Chev.). A slender twiner with conspicuous flowers 1–1¼ in. in diameter, white with deep purple-stained centre, and inflated fruits.

French Sudan : Nyamina and Koulikoro (Oct.) ; Ségou ; Sébi (Aug.). Senegal : Dakar, etc. ! Sierra Leone : Laminaya (Apr.) ! N. Prov., ? locality ! Ivory Coast : Lower Comé, abundant on the river bank (Mar.) ! Middle Sassandra, Soubré (June) ! Middle Cavally, Mt. Nienokoué, 1,500 ft. (July) ! Gold Coast : Volta R. ! N. Nigeria : Nupe, Sokoto, Katagum, common in savannah bush, especially on stream banks ! Bauchi Plateau, Lemme, 2,600 ft. (May) ! Lake Chad ! S. Nigeria : Oloke Meji ! Lagos Colony ! Abeokuta ! Extends through N. Cameroons to E. Sudan and Somaliland. Exsicc.—*Roger*. *Heudelot* 423. *Barter* 1131. *Irving* 27. *Rowland*. *Anderson* 15. *Dalz*. 982. *Foster* 298. *Lely* 144. *Moiser* 125. *N. W. Thomas* 145. *Dawe* 510. *Talb*. 1014. *Gaillard*. (See Appendix).

### 12. **PERGULARIA** Linn. (sensu N.E.Br. in Dyer Fl. Cap. 4, 1 : 757) (*Daemia* R.Br.—F.T.A. 4, 1 : 385).

Stems twining, pubescent ; leaves ovate-orbicular, widely cordate at the base, cuspidate-acuminate, up to 15 cm. long and 12 cm. broad, shortly pubescent on both surfaces or only on the nerves ; flowers corymbose-racemose ; peduncle elongated ; bracts about 2 mm. long ; pedicels 3 cm. long, slender ; sepals ovate, 3–4 mm. long ; corolla about 1 cm. long, lobes bearded on the margin ; fruits lanceolate, 5–8 cm. long, beaked, mostly echinate, pubescent ; seeds 8 mm. long, pubescent .. 1. *extensa*

Stems tomentose ; leaves ovate-orbicular, deeply cordate at the base, slightly apiculate, up to 5 cm. diam., tomentose on both surfaces ; peduncle very short ; pedicels about 1 cm. long, very slender ; sepals lanceolate, villous ; corolla about 8 mm. long, tube cylindric narrow, lobes elliptic, bearded inside the margin ; fruits ovoid, 4–6 cm. long, beaked, minutely tomentose, more or less echinate ; seeds ovate, 8 mm. long, tomentellous .. .. .. .. .. .. .. .. 2. *tomentosa*

1. **P. extensa** *N.E.Br.* in Dyer Fl. Cap. 4, 1 : 758. *Daemia extensa* R.Br.—F.T.A. 4, 1 : 387 ; Chev. Bot. 435. A fairly strong twiner harshly pubescent on stems, petioles, etc., with milky latex and cream-white and purple flowers ⅓–½ in. across.

Senegal and French Sudan to N. and S. Nigeria and Cameroons ! Extends to S. Africa, Madagascar, and Arabia to India. Exsicc.—*Heudelot* 416. *Döllinger*. *Don* 8. *T. Vogel* 15 ; 17 ; 36 ; 178. *Ansell*. *Barter* 1320. *Moloney*. *Johnson* 821. *Millson*. *Farmar* 125 ; 405. *Dawodu* 249. *Talb*. 997. (See Appendix).

2. **P. tomentosa** *Linn*. Mant. 1 : 53. *Daemia cordata* R.Br.—F.T.A. 4, 1 : 386 ; Chev. Bot. 435. Undershrub with decumbent branches, pale yellowish or white tomentose, with milky latex, white and purple flowers ½ in. across in corymb-like racemes, and fruit covered with soft prickles.

N. Nigeria : Sokoto Province, common in open grasslands ! Katagum (Jan.) ! Extends from Mauritania through N. Africa and E. Sudan to Beluchistan. Exsicc.—*Dalz*. 322. *Foster* 14. *Lely* 147 ; 154. *Moiser* 46 ; 121. (See Appendix).

### 13. **KANAHIA** R. Br.—F.T.A. 4, 1 : 295.

Stems woody, glabrous ; leaves broadly linear, ascending, acute, up to 15 cm. long and 1 cm. broad, glabrous ; flowers in umbel-like racemes ; bracts linear, the lowest about 7 mm. long ; pedicels up to 2 cm. long, angular towards the top ; sepals lanceolate, 5–6 mm. long ; corolla 1 cm. long, deeply 5-lobed, lobes ovate-triangular, villous inside ; fruit ovoid, about 3 cm. long ; seeds ovoid, shortly beaked, crowned by a tuft of silky hairs .. .. .. .. .. .. .. .. *consimilis*

**K. consimilis** *N.E.Br.*—F.T.A. 4, 1 : 298. *Asclepias fluviatilis* A. Chev. Bot. 434, name only. Undershrub with stiff erect branches 4–5 ft. high, milky latex and white sweet-scented flowers ½–⅔ in. across.

Ivory Coast : Comoé R., between Alépé and Malamalasso (Mar.) ! Mankono, bed of Bandama R. (July) ! Dahomey : Ouémé R. between Save and Agouagon (May) ! N. Nigeria : Lokoja (Mar.) ! Jira, on river banks and river beds (May) ! S. Nigeria : Idogun, river bank ! Lagos Colony, on an island in the Oba-Oba River (Aug.) ! Oban ! Johann-Albrechtshöhe ! Also in Cameroons. Exsicc.—*Rowland*. *Millen* (no number). *Foster* 57. *Shaw* 33. *Lely* 125. *Staudt* 603. *Preuss* 1364. *Chev*. 17514 ; 22021 ; 23594.

### 14. **GLOSSONEMA** Decne.—F.T.A. 4, 1 : 290.

A small herb up to 30 cm. high, with a creeping rhizome ; stems shortly pubescent ; leaves linear or linear-lanceolate, acute, up to 12 cm. long, 3–10 mm. broad, undulate on the margin, shortly pubescent below ; flowers few in sessile cymes ; sepals pubescent 3 mm. long ; corolla 4 mm. diam. ; fruits lanceolate, acuminate, 4 cm. long, echinate, pubescent ; seeds ovate, denticulate .. .. .. .. *nubicum*

**G. nubicum** *Decne.*—F.T.A. 4, 1 : 291 ; Chev. Bot. 431. Erect, branched, grey-pubescent herb or shrublet, from a woody base, 6–12 in. high, with milky juice, small white or lilac flowers and fruit-follicles covered with soft spines.

French Sudan : Bamako (Jan.) ! Timbuktu (July) ! Mossi, Zapara to Zorgo (July) ! Gourma, Diapaga (July) ! N. Nigeria : fairly common in the north from Borgu to Chad ! Extends to E. Sudan. Exsicc.—*E. Vogel* 88. *Barter* 723 ; 3434. *Dalz*. 99 ; 368. *Moiser* 187. *Thornewill* 30 ; 35. (See Appendix).

### 15. **SOLENOSTEMMA** Hayne—F.T.A. 4, 1 : 402.

Stems minutely puberulous, pale green ; leaves lanceolate, obtuse, 2–3 cm. long, 5–8 mm. broad, 1-nerved, minutely puberulous ; flowers in axillary cymes, numerous ; sepals oblong-lanceolate, 5 mm. long ; corolla 8 mm. long, lobes pubescent ; fruit lanceolate, 6–10 cm. long, glabrous .. .. .. .. .. .. .. *argel*

**S. argel** *Hayne* l.c. A bush 8–12 ft. high, with pale grey-green stems and leaves, white latex, woody stock and white flowers.

French Sudan : Air ! Abelessa, 2,800 ft. (fr. Mar)) ! Also in E. Sudan, Upper Nile land, Egypt and Arabia. Exsicc.—*Chipp* 52 ; 68. *Rodd.* (See Appendix).

## 16. CALOTROPIS R.Br.—F.T.A. 4, 1 : 294.

A shrub ; leaves ovate to obovate, cordate at the base, abruptly pointed, 7–30 cm. long, up to 16 cm. broad, glabrous ; cymes arising from between the bases of the leaves, subumbellate, several-flowered ; bracts lanceolate or ovate-lanceolate, acute ; pedicels 1–2·5 cm. long ; sepals 6 mm. long ; corolla campanulate, about 2 cm. diam. ; fruits subglobose to obliquely ovoid, about 8–9 cm. long, with a thick spongy or inflated pericarp ; seeds minutely tomentose .. .. .. .. *procera*

**C. procera** *Ait.*—F.T.A. 4, 1 : 294 ; Holl. 3 :463 ; Chev. Bot. 433. A stout but soft-branched shrub 10–18 ft. high, white-hoary all over, with broad leaves, conspicuous white and purple flowers ¾ in. or more across, and inflated fruits.

Common from Mauritania and Senegal to N. Nigeria ! Often found planted near coastal towns. Fernando Po (introduced) ! To E. Sudan, Uganda and E. Africa, and through Egypt and Arabia to India. Exsicc.—*Brunner* 54. *Mann* 238. *Ozanne* 3. *Dalz.* 304. (See Appendix).

## 17. ASCLEPIAS Linn.—F.T.A. 4, 1 : 313.

Leaves rounded or cordate at the base, oblong or oblong-lanceolate, rounded and mucronate at the apex, 7–12 cm. long, up to 5 cm. broad, with numerous lateral nerves, slightly scabrid on both surfaces and especially on the margin ; umbels axillary, pedunculate, several-flowered ; pedicels about 2 cm. long, pubescent ; bracts linear ; corolla about 1 cm. long .. .. .. .. .. 1. *lineolata*
Leaves narrowed to the base, linear or lanceolate :
  Leaves lanceolate, 1·5–2·5 cm. broad, acutely acuminate, glabrous ; stems glabrous or nearly so ; pedicels slightly pubescent, about 1·5 cm. long ; corolla soon reflexed ; fruits spindle-shaped, smooth, about 8 cm. long .. .. .. 2. *curassavica*
  Leaves linear :
    Stems and pedicels glabrous ; leaves about 15 cm. long, 6 mm. broad, with a very prominent midrib below ; peduncle 4–5 cm. long ; pedicels 3–4 cm. long ; sepals linear-lanceolate, 6 mm. long ; corolla-lobes obovate-elliptic, nearly 1·5 cm. long ; fruits lanceolate, about 9 cm. long, glabrous .. .. .. 3. *solstitialis*
    Stems and pedicels pubescent :
      Pedicels about 1 cm. long ; leaves about 6 cm. long, slightly scabrid above ; sepals ovate, pubescent ; fruits very long-stipitate, linear-lanceolate, the fruit body about 7 cm. long, glabrous .. .. .. .. .. .. 4. *foliosa*
      Pedicels 2·5 cm. long ; leaves about 15 cm. long, pubescent on the midrib below ; sepals linear-lanceolate, very acutely acuminate, 8 mm. long, softly pubescent outside ; fruits obliquely ellipsoid, densely setose .. .. 5. *semilunata*

1. **Asclepias lineolata** *Schlechter*—F.T.A. 4, 1 : 322 ; Holl. 4 : 464; Chev. Bot. 434. Erect undershrub 2–4 ft. high, hairy in the upper part, with spindle-shaped roots, and greenish-white flowers with red-purple markings.
   Common in savannah grass and bush, from French Sudan and French Guinea to N. Nigeria ! In tropical Africa generally. Exsicc.—*Barter* 1323A. *Dalz.* 2. *Anderson* 3. *Thornton.* *Lely* 236. *Dent Young* 171. *Howes* 925. *Collenette* 75.
2. **A. curassavica** *Linn.*—F.T.A. 4, 1 : 328 ; Holl. 3 : 464. Erect, 2–3 ft. high, with umbels of attractive flowers ½–⅝ in. long with scarlet reflexed corolla and yellow corona. A native of tropical America cultivated as an ornament.
3. **A. solstitialis** *A. Chev.* Bot. 434, name only. Erect undershrub 2 ft. or more high, with pedunculate lateral umbels of flowers ¾ in. across, the corolla white with red-purple or blue corona.
   French Guinea : Soarella (June) ! Ivory Coast : Middle Sassandra, savannah plains between Kouroukoro and Touna (May) ! Mankono, between Seguéla and Siana (June) ! Mt. Kamouéniboka, near Marabadiassa (July) ! Gold Coast : Yeji (Aug.) ! N. Nigeria : Zungeru, by Dago stream (July) ! Aguji, near Ilorin ! Exsicc.—*Dalz.* 3. *Thornton.* *Pomeroy* 1343. *Pobéguin* 1007.
4. **A. foliosa** *N.E.Br.*—F.T.A. 4, 1 : 349. Erect, a few inches to 18 in. high, with a carrot-shaped root, and purple and white flowers ¾ in. across in lateral and terminal few-flowered umbels.
   French Guinea : Futa-Jallon, Ditinn to Diaguissa ! N. Nigeria : Bauchi Plateau, Naraguta (June)! Mongu, 4,300 ft. (July) ! Vom ! Also in Cameroons and Congo basin. Exsicc.—*Lely* 317 ; 442. *Dent Young* 172. *Chev.* 12849.
5. **A. semilunata** *N.E.Br.*—F.T.A. 4, 1 : 327. *A. euphorbioides* A. Chev. Erect, 2–5 ft. high, more or less tomentose in the upper parts, with lateral umbels of white and purple flowers ⅝ in. across, and semilunar inflated fruits 2 in. or more long covered with long bristles.
   French Guinea : various localities ! N. Nigeria : Bauchi Plateau (Apr.) ! Extends to Abyssinia, E. Africa and to Angola. Exsicc.—*Lely* P. 248. *Chev.* 18372, etc.

## 18. SCHIZOGLOSSUM E. Mey.—F.T.A. 4, 1 : 353.

Leaves oblong-lanceolate, subacute, 4–6 cm. long, about 1 cm. broad, softly pubescent ; petiole 3–4 mm. long ; flowers in a very shortly pedunculate axillary panicle ; pedicels 1 cm. long, pubescent ; sepals linear-lanceolate, 6 mm. long ; corolla 6 mm. long .. .. .. .. .. .. .. .. 1. *Petherickianum*
Leaves linear or linear-acicular, glabrous or nearly so :
  Stems pubescent all round, thin and wiry ; leaves subtending the flower clusters very narrow, pubescent ; pedicels about 3 mm. long ; fruit 6 cm. long, slender, beaked, pubescent .. .. .. .. .. .. .. 2. *angustissimum*

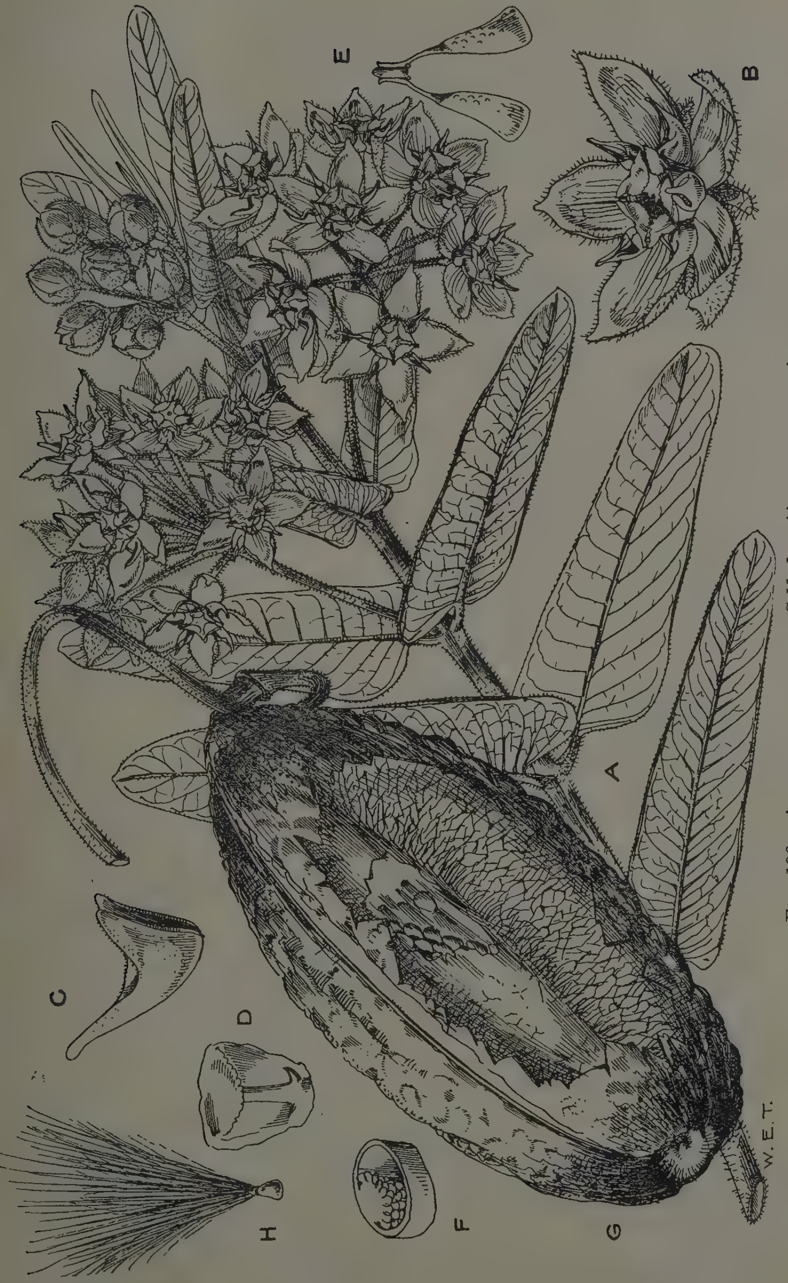


FIG. 196.—ASCLEPIAS LINEOLATA *Schlechter* (ASCLEPIADACEAE).

A, flowering shoot. B, open flower. C, outer corona-lobe. D, inner corona-lobe. E, pollinia. F, cross-section of carpel. G, fruit. H, seed.

Stems with a line of hairs only ; leaves as above but broader and flat, glabrous ; pedicels slender, in fascicles on leafless shoots ; fruits glabrous .. 3. *Glanvillei*

1. **Schizoglossum Petherickianum** *Oliv.*—F.T.A. 4, 1 : 368. Erect pale-tomentose, branched from a woody base, with whitish and purple-tinged flowers and lanceolate fruit-follicles 2½ in. long.
N. Nigeria : Kontagora (Jan.) ! Sokoto ! Katagum ! Bauchi Plateau (Jan.) ! Also in Upper Nile Land and Uganda. Exsicc.—*Dalz.* 1 ; 375. *Lely* 112 ; P. 84.

2. **S. angustissimum** *K. Schum.* in Engl. Bot . Jahrb. 17 : 123; Chev. Bot. 433. *S. togoense* Schlechter. A slender perennial 1–2 ft. high from a carrot-shaped rootstock, with very small greenish-purple flowers.
French Sudan : Gourma (July) ! Ivory Coast : Baoulé Sud, Toumodi ! Gold Coast : Accra ! Akuse ! N. Nigeria : Zungeru, common in grass (June) ! Sokoto (May–June) ! Abinsi ! Also in Upper Nile land. Exsicc.—*Dalz.* 154 ; 574 ; 686. *Schlechter* 12972.

3. **S. Glanvillei** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Habit of the last.
Sierra Leone : Rowalla (fr. July) ! N. Prov. : Kulufaga (Apr.) ! Exsicc.—*Glanville* 192. *N. W. Thomas* 1075 ; 1096.

## 19. XYSMALOBIUM R.Br.—F.T.A. 4, 1 : 298.

Leaves rounded at the base and subsessile, linear-oblong to oblong-lanceolate, subacute at the apex, up to 10 cm. long and 2 cm. broad, glabrous, with numerous prominent lateral nerves ; pedicels stiff, 1 cm. long, pubescent ; corolla 5 mm. long, soon reflexed ; fruit narrow, acute at both ends, up to 15 cm. long ; seeds flat, covered with linear wavy tubercles .. .. .. .. .. .. .. .. 1. *Heudelotianum*

Leaves narrowed to the base, petiolate, narrowly linear-oblanceolate, acute, light glaucous-green when dry, with very obscure nerves, 7–9 cm. long, 1–1·5 cm. broad ; pedicels about 0·5 cm. long, tomentellous ; sepals ovate-lanceolate ; corolla 8 mm. long ; anther-appendages membranous .. .. .. 2. *membraniferum*

1. **X. Heudelotianum** *Decne.*—F.T.A. 4, 1 : 304 ; Holl. 3 : 464 ; Chev. Bot. 432. Stems 1–2 ft. high, sometimes more, pubescent, from a carrot-shaped tuber, with umbels lateral at the nodes ; flowers ¼ in. long, greenish-white and purple, numerous, with reflexed corolla.
French Sudan : several localities ! Senegal : Komba. Ivory Coast : Baoulé-Nord, savannah between Diahbo and Bouaké (July) ! Gold Coast : ? locality ! Dahomey : common in savannah in the north, and on the Atacora Mts. ! N. Nigeria : Borgu ! Nupe ! Kontagora, Lokoja, etc., common in bush after burning (Jan.–Mar.) ! Abinsi (June–July) ! Keana, Nassarawa (Feb.) ! Bauchi Plateau, Mongu, 4,300 ft. (July) ! Vom ! Bichikki (May) ! Exsicc.—*Barter* 712 ; 1323. *Dalz.* 4 ; 692 ; 693 ; 694. *Anderson.* *Lely* P. 69 ; 177 ; 439. *Dent Young* 175. *Hepburn* 3. (See Appendix).

2. **X. membraniferum** *N.E.Br.*—F.T.A. 4, 1 : 304 ; Chev. Bot. 433, partly. Stems 12–18 in. high from a thickened base, pubescent at least along two surfaces, with lateral umbels of white and purple-tinted flowers ; fruit-follicle spindle-shaped 9 in. long including the beak and long basal stipe.
Sierra Leone : Falaba district, dry rocky hills, 3,600 ft. (Mar.) ! Port Lokko ! Samaia (fr. May) ! Ivory Coast : Middle Sassandra, savannah plain between Kouroukoro and Touna (May) ! Mankono, between Séguéla and Siana (June) ! Exsicc.—*Sc. Elliot* 5183 ; 5184. *Chev.* 21799 ; 21848.

## 20. MARGARETTA Oliv.—F.T.A. 4, 1 : 372.

Stems subsimple from a woody rhizome, pubescent ; leaves broadly linear, subacute, rounded at the base, sessile, 4–6 cm. long, about 1 cm. broad, scabrid-pubescent on both surfaces ; cymes terminal, subsessile, densely flowered, hirsute-pubescent ; sepals hirsute ; corolla about 8 mm. long .. .. .. .. *inopinata*

**M. inopinata** *Hutch.* in Kew Bull. 1921 : 387. Perennial with annual shoots a few inches to 1 ft. high from a swollen tap-root, with milky juice and bright yellow flowers ⅓ in. long.
N. Nigeria : Bauchi Plateau, plains between Hepham and Ropp, 4,600 ft. (July) ! Naraguta ! Exsicc.—*Lely* 366 ; P. 226.

## 21. SARCOSTEMMA R.Br.—F.T.A. 4, 1 : 383.

Branchlets leafless, terete, pubescent at the nodes ; flowers fasciculate, several to each node ; pedicels about 6 mm. long, woolly-pubescent ; sepals ovate-lanceolate, 1·5 mm. long, pubescent outside ; corolla 5–6 mm. long ; fruits 5–10 cm. long, linear-lanceolate, acuminate, thinly puberulous .. .. .. .. .. .. *viminale*

**S. viminale** *R.Br.*—F.T.A. 4, 1 : 384 ; Chev. Bot. 435. Twining, trailing or sometimes bushy, more or less succulent, with milky latex, and white fragrant flowers in lateral or terminal umbels.
French Sudan : Fo, on rocks (June) ! San, on barren laterite plateau (June) ! Gold Coast : Cape Coast (July) ! Commendah, near the sea (Sept.) ! Accra Plains, in hedges (Jan.) ! Krobo Plains (Jan.) ! Dahomey : Kotonu. N. Nigeria : Nupe, on rocks ! Bauchi Plateau, Takwara, 3,200 ft. (May) ! Extends to E. Sudan, E. Africa, Angola and S. tropical Africa. Exsicc.—*T. Vogel* 21. *Barter* 1322. *Johnson* 604. *Chipp* 577. *Dalz.* 71. *Lely* 109.

## 22. GYMNEMA R.Br.—F.T.A. 4, 1 : 413.

Stem climbing, woody, shortly tomentose ; leaves ovate to ovate-lanceolate, acuminate, cuneate to rounded or cordate at the base, glabrous or thinly pubescent to densely pubescent, up to 7 cm. long and 4 cm. broad ; flowers umbellate, sessile or stalked, many-flowered ; pedicels up to 6 mm. long ; sepals 2 mm. long, ciliate ; corolla about 4 mm. long, lobes spreading-recurved ; fruit lanceolate, 6–9 cm. long, beaked, glabrous ; seeds glabrous, ovate, 8–10 mm. long .. .. .. .. *sylvestre*

**G. sylvestre** *R.Br.*—F.T.A. 4, 1 : 413 ; Holl. 3 : 465 ; Chev. Bot. 436. A common climber with yellowish-white or greenish flowers in subaxillary umbels.
French Sudan : Yatenga, Ouahigouya (Aug.) ! Senegal : several localities ! French Guinea : Kouroussa (July) ! Gold Coast : Cape Coast (July) ! Accra, common (Aug.) ! Somanya, Krobo Plains (Aug.) ! Togo : Lome ! N. Nigeria : Tokoja (Sept.) ! Katagum (Aug.) ! Hadeija (fr. Mar.) ! S. Nigeria : Lagos Colony, several localities ! Ila (Oct.) Aguku ! Throughout tropical Africa, and in S. Africa, Madagascar and in India. Exsicc.—*Roger* 49. *Sieber.* *T. Vogel* 46 ; 72 ; 166. *Ansell.* *Barter* (no number). *Johnson* 1082 ; 1083. *Millen* 49. *Dawodu* 89. *Dalz.* 97 ; 155. *Pobéguin* 277. *Warnecke* 248. (See Appendix).

### 23. TYLOPHORA R.Br.—F.T.A. 4, 1 : 404.

Leaves cordate or subcordate at the base :

Leaves ovate-suborbicular, widely rounded-subcordate at the base, abruptly acuminate, about 12 cm. diam. ; lateral nerves 5 pairs ; petiole 3–4 cm. long ; flowers in a lax panicle ; pedicels up to 5 mm. long ; corolla 3 mm. long .. 1. *cameroonica*

Leaves oblong-ovate to oblong-lanceolate, mostly deeply cordate at the base :

Branches or axis of inflorescence pubescent :

Branches of inflorescence elongated and slender ; pedicels about 5 mm. long, pubescent ; leaves ovate-oblong, very acutely acuminate, up to 16 cm. long and 8 cm. broad, very thin ; petiole 2–3 cm. long ; lateral nerves about 5 pairs ; fruits about 7 cm. long, beaked .. .. .. .. .. .. 2. *sylvatica*

Branches of inflorescence very short and stiff ; leaves broadly oblong-ovate, broadly and shortly acuminate, 10–12 cm. long, 6–8 cm. broad, puberulous on the nerves below ; corolla 1·5 cm. diam. .. .. .. .. .. 3. *conspicua*

Branches of inflorescence glabrous or nearly so, not elongated :

Leaves prominently 5-nerved from the base, oblong-elliptic, gradually acuminate, overlapping-cordate at the base, about 6 cm. long and 3 cm. broad ; petiole 1·5 cm. long ; sepals lanceolate, pubescent .. .. .. ..4. *smilacina*

Leaves pinnately nerved, oblong-elliptic, very acutely acuminate :

Sepals shortly ciliate ; fruits very narrow, about 8 cm. long .. .. 5. *occulata*

Sepals not ciliate .. .. .. .. .. .. .. .. 6. *liberica*

Leaves rounded or subcuneate at the base :

Leaves ovate or oblong-elliptic, long-mucronate-apiculate :

Branches softly pubescent ; flowers fasciculate on the axis ; pedicels slender, 4–8 mm. long .. .. .. .. .. .. .. .. .. 7. *dahomensis*

Branches glabrous :

Flowers in short racemes on the main axis ; pedicels 8 mm. long ; corolla 4 mm. long ; fruit 8 cm. long .. .. .. .. .. .. .. 8. *oblonga*

Flowers in fascicles on the main axis ; pedicels 6 mm. long ; corolla 4 mm. long 9. *Deightonii*

Leaves linear-lanceolate, 3–4 cm. long ; flowers few, in distant fascicles on the slender axis ; pedicels 6–8 mm. long, pubescent ; corolla deeply lobed, 3 mm. long ; stems erect from a woody rhizome .. .. .. .. .. 10. *orthocaulis*

1. **Tylophora cameroonica** *N.E.Br.*—F.T.A. 4, 1 : 407. A glabrous climber with hollow stem, broad leaves and small purple flowers in clusters along the branches of paniculate cymes.
S. Nigeria : Rio del Rey ! Cameroons Mt., below Buea (Feb.) ! Exsicc.—*Johnston* 44. *Dalz.* 8236.

2. **T. sylvatica** *Decne.*—F.T.A. 4, 1 : 407 ; Chev. Bot. 437. A fairly strong twiner and climber, the stems pubescent along 2 lines, with small deep red-purple flowers in clusters along the axis of a sublateral inflorescence.
Senegal ! Sierra Leone : Leicester (June) ! Falaba (Mar.) ! Kuntaia (June) ! Njala (July) ! Liberia : Cape Palmas (July) ! Ivory Coast and Gold Coast : several localities ! Togo : Misahöhe ! N. Nigeria : Jebba ! S. Nigeria : Lagos, Ikoyi (fr. Aug.) ! Epe (fr. Feb.) ! Odo-Onon ! Akassa (Sept.) ! Obu ! Oban ! Fernando Po (Nov.) ! Extends to Congo and to E. Africa. Exsicc.—? *Heudelot* 816. *T. Vogel* 3 ; 237. *Barter* 1321. *Mann* 479. *Sc. Elliot* 5455. *Millen* 166. *Rowland. Dawodu* 173. *Dutton* 29. *Johnson* 770 ; 946. *Baumann* 511.

3. **T. conspicua** *N.E.Br.*—F.T.A. 4, 1 : 405 ; Chev. Bot. 436. A strong climber with unpleasant smell, shortly pubescent, with dark purple flowers ½–⅜ in. across.
Ivory Coast : Upper Nuon, Dyola country between Ganhoué and Bampleu (Apr.) ! Upper Cavally, foot of Mt. Do, 2,900 ft. ! Gold Coast : Aburi (May) ! Ashanti, Amentia ! Also in Angola. Exsicc.—*Johnson* (no number). *Irvine* 518. (See Appendix).

4. **T. smilacina** *S. Moore* in Journ. Bot. 1914 : 29. A twiner, pubescent along 2 lines, with red-purple flowers ¼–⅓ in. across.
S. Nigeria : Eket, Ikotobo, near the Sacred Lake ! Exsicc.—*Talb.* 3252.

5. **T. oculata** *N.E.Br.*—F.T.A. 4, 1 : 406. A nearly glabrous twiner, with flowers ¼–⅓ in. across, greenish with purple centre, in two umbel-like clusters on a slender axillary peduncle 2–3 in. long.
Sierra Leone : Matotoka (fr. July) ! Kanya (Oct.) ! Toma (fr. Feb.) ! Exsicc.—*Sc. Elliot. N. W. Thomas* 1277 ; 3007 ; 8781.

6. **T. liberica** *N.E.Br.* in Journ. Linn. Soc. 37 : 109 ; Stapf 632. *Secamone conostyla* S. Moore. A twiner with glabrous striate hollow stems, and small green and purple flowers ¼ in. across in clusters along a slender axis.
Liberia : Sino basin ! S. Nigeria : Oban ! Eket ! Exsicc.—*Whyte. Talb.* 1013 ; 1030 ; 3360.

7. **T. dahomensis** *K. Schum.*—F.T.A. 4, 1 : 619 ; *T. minutiflora* A. Chev. Bot. 436, name only. A twiner with slender striate pubescent stems and small red-purple flowers clustered on a slender axis 1–2 in. long.
Ivory Coast : Mankono, between Béré stream and Dialakoro (June) ! Agboville (Nov.) ! Togo : Lome ! Dahomey : Newton. Exsicc.—*Warnecke* 190. *Chev.* 21957 ; 22378.

8. **T. oblonga** *N.E.Br.*—F.T.A. 4, 1 : 408. A slender glabrous twiner with small white flowers, inflorescence 2–3 in. long.
Fernando Po ! Exsicc.—*Mann* 277.

9. **T. Deightonii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Climber with pale yellow flowers.
Sierra Leone : Hill Station (Oct.) ! Exsicc.—*Deighton* 219.

10. **T. orthocaulis** *K. Schum.*—F.T.A. 4, 1 : 410 ; Chev. Bot. 436. Erect 2–2½ ft. high, low-branching from a woody stock, striate, pubescent along lines, with small green and purple flowers on slender pedicels, the inflorescence 3–4 in. long.
French Guinea : Kouria (Nov.) ! Konanké country, between Kesséridou and Oussoudou (Feb.) ! Guerzé country, Mt. Nzo, 2,400 ft. (Mar.) ! Sierra Leone : ? locality. Exsicc.—*Afzelius. Chev.* 15064 ; 20837 ; 21010.

### 24. TELOSMA Coville in U.S. Dept. Agric. Contrib. Nat. Herb. 9 : 384 (1905).

Stems glabrous ; leaves ovate-oblong to broadly ovate, shortly cuspidate, cuneate to cordate at the base, 5–10 cm. long, up to 7 cm. broad ; umbels many-flowered, sessile or shortly pedunculate ; pedicels 4–6 mm. long, glabrous ; sepals ovate to lanceolate, 4 mm. long .. .. .. .. .. .. .. .. .. *africana*

**T. africana** *N.E.Br.* in Dyer, Fl. Cap. 4, 1 : 776. *Peryuluria africana* N.E.Br.—F.T.A. 4, 1 : 426 ; Chev. Bot. 437. A slender twiner with yellow flowers purple inside with hairy throat, inflated in the lower part, ½–⅔ in. long.

French Sudan : Gourma, Fada to Koupéla (July). Sierra Leone : Kafogo, Limba (Apr.) ! Bafodeya (Apr.) ! Kamalu (May) ! Gold Coast : ? locality ! N. Nigeria : Nupe ! S. Nigeria : Lagos Colony ! Ijaye ! Calabar ! Also in Cameroons and extending to Uganda, Nyasaland and Natal. Exsicc.—*Barter* 3332. *Thomson* 113. *Sc. Elliot* 5489 ; 5498 ; 5553. *Rowland.* *Farmar* 414. *N. W. Thomas* 321 ; 9833. *Chev.* 24533.

## 25. MARSDENIA R.Br.—F.T.A. 4, 1 : 417.

Leaves tomentose or densely long-pilose below ; branchlets pilose or villous :
  Leaves tomentose all over the lower surface, ovate, acutely acuminate, deeply cordate, 7–10 cm. long, 5–7 cm. broad, thinly pubescent above ; cymes branched from the base, many-flowered ; sepals ovate, appressed-pubescent ; corolla shortly pubescent outside.. .. .. .. .. .. .. .. .. 1. *angolensis*
  Leaves densely pilose mainly on the nerves below, acutely acuminate, cordate or rounded at the base, 9–12 cm. long, 3·5–8 cm. broad, loosely pilose above ; cymes pedunculate, subumbellate ; lower bracts linear, leafy ; sepals lanceolate, pilose ; corolla-lobes lanceolate, about 7 mm. long .. .. .. .. 2. *crinita*
Leaves glabrous or slightly pubescent :
  Inflorescence sessile ; flowers rather numerous on slender pedicels :
    Corolla nearly 1 cm. long ; leaves ovate-oblong, with a broad oblique acumen, rounded or subcordate at the base, 6–8 cm. long, 3·5–4·5 cm. broad, with 3–4 pairs of lateral nerves .. .. .. .. .. .. .. 3. *rostrifera*
    Corolla about 5 mm. long ; leaves elliptic, obliquely acuminate, rounded-subcordate at the base, 8–12 cm. long, 5–6 cm. broad, with about 4 pairs of looped lateral nerves ; petiole glandular at the apex .. .. .. .. .. 4. *efulensis*
  Inflorescence pedunculate:
    Leaves cordate at the base :
      Inflorescence a panicle with raceme-like branches :
        Sepals glabrous or nearly so outside, triangular ; pedicels short, glabrous ; leaves broadly ovate-elliptic, acutely caudate-acuminate, deeply and closely cordate, about 12 cm. long and 7 cm. broad, glabrous.. .. .. .. 5. *profusa*
        Sepals pubescent outside towards the base ; pedicels softly pubescent ; leaves as above but openly cordate .. .. .. .. .. .. 6. *latifolia*
      Inflorescence cymose :
        Inflorescence axillary, short and few-flowered ; leaves ovate-oblong, acutely acuminate, openly cordate, 8–10 cm. long, 4–5 cm. broad, glabrous 7. *leonensis*
        Inflorescence terminal, many-flowered ; leaves as above but smaller 8. *glabriflora*
    Leaves not cordate at the base, mostly broadly and very shortly cuneate, broadly acuminate, 6–11 cm. long, 3·5–7 cm. broad, with 4–5 pairs of lateral nerves ; peduncle stout, woody, up to 2 cm. long ; pedicels crowded, rusty-tomentellous ; corolla about 5 mm. long, tomentose inside .. .. .. 9. *abyssinica*

1. **Marsdenia angolensis** *N.E.Br.*—F.T.A. 4, 1 : 423. A softly-hairy twiner with greenish-white (?) flowers in short dense cymes.
Sierra Leone : Yakala (Sept.) ! Also in Angola. Exsicc.—*N. W. Thomas* 2365.

2. **M. crinita** *Oliv.* in Hook. Ic. Pl. t. 1993.—F.T.A. 4, 1 : 418. A stout twiner, coarsely tawny hairy, with white flowers nearly ½ in. long in dense lateral cymes, and fruit-follicles 4–4⅓ in. long, obtuse, 2¼ in. broad when expanded, with flat seeds ½ in. long crowned with a sessile tuft of floss.
Sierra Leone : Bendembu, Limba (Apr.) ! Tiama, near Njala (fr. Jan.) ! S. Nigeria : Oyo (May.) ! Exsicc. —*Barter* 3426. *Sc. Elliot* 5651. *Millson.* *Dalz.* 8095.

3. **M. rostrifera** *N.E.Br.* in Kew Bull. 1906 : 250. A glabrous twiner with shining leaves and dark crimson-brown succulent flowers ½ in. across in axillary umbels, with an unpleasant odour.
Gold Coast : Aburi, in plantations (Sept.) ! Exsicc.—*Johnson* 1078.

4. **M. efulensis** *N.E.Br.* in Hook. Ic. Pl. t. 2497.—F.T.A. 4 : 423. A glabrous half-woody climber, with greenish flowers ½ in. across in sessile umbel-like cymes.
S. Nigeria :Oban ! Also in Cameroons. Exsicc.—*Talb.* 1684.

5. **M. profusa** *N.E.Br.*—F.T.A. 4, 1 : 425. A strong climber with hollow glabrous stem and small white flowers in small umbels on the lateral branches of a panicle 5–8 in. long.
S. Nigeria : Brass ! Exsicc.—*Barter* 16.

6. **M. latifolia** *K. Schum.* in Just Jahresb. 26, 1 : 372 ; Chev. Bot. 437. *Gongronema latifolium* Benth. *M. racemosa* K. Schum.—F.T.A. 4, 1 : 425. A strong climber with milky juice and hollow stems, softly pubescent, with greenish-yellow flowers in short extra-axillary panicles of racemes.
French Sudan : Kangala (May) ! French Guinea : Guerzé country, near Nzo (Mar.) ! Sierra Leone : Waterloo (July) ! Njala (May) ! Ivory Coast : several localities ! Gold Coast : Kwahu (Apr.) ! Ashanti, Amentia ! Agogo (Apr.) ! Togo ! S. Nigeria : Lagos Colony ! Ikorodu ! Oban ! Also in St. Thomas Island, Angola and South Tropical Africa. Exsicc.—*Rowland.* *Johnson* 649. *Lane-Poole* 316. *Talb.* 2072. *Baumann* 465. (See Appendix).

7. **M. leonensis** *Benth.*—F.T.A. 4, 1 : 424. A twiner with puberulous stems and greenish-yellow (?) flowers in subaxillary cymes about 1 in. long.
Sierra Leone : ? Freetown ! Exsicc.—*T. Vogel* (no number).

8. **M. glabriflora** *Benth.*—F.T.A. 4, 1 : 424. A half-woody climber with hollow stems, nearly glabrous, with small flowers cymose-paniculate, terminal and in the upper axils ; fruit follicle about 3 in. long.
Sierra Leone : ? Freetown ! S. Nigeria : Bonny (Oct.) ! Exsicc.—*T. Vogel* (no number). *Mann* (no number).

9. **M. abyssinica** *Schlechter* in Engl. Bot. Jahrb. 51 : 143. *Pterygocarpus abyssinicus* Hochst. *M. spissa* S. Moore—F.T.A. 4, 1 : 420. A half-woody climber, ochrey on the young shoots and inflorescence, with

whitish flowers ⅛ in. across crowded in subumbellate cymes on a short lateral peduncle ; fruit-follicles 3–4 in. long, 1–1½ in. broad, beaked, with several longitudinal frill-like wings.

Gold Coast : N. Terr., Tamale ! N. Nigeria : Tegina (Apr.) ! S. Nigeria : Abeokuta ! Extends to Abyssinia, the Red Sea, E. Africa and Angola. Exsicc.—*Barter* 3369. *Dalz.* 369. *Anderson* 14.

### 26. **ANISOPUS** N.E.Br.—F.T.A. 4, 1 : 415.

Leaves rounded at the base, ovate-elliptic, acutely acuminate, 6–8 cm. long, 3–4 cm. broad, with 4 pairs of lateral nerves, reticulate ; petiole 1–2 cm. long, with a gland at the apex ; flowers about 20 in an umbel ; peduncle up to 1 cm. long ; pedicels about 8 mm. long, glabrous ; sepals ovate ; corolla 5-lobed, short, the lobes tomentose inside ; fruits about 15 cm. long, narrow tapering to a hooked point, smooth, glabrous ; seeds broadly linear, smooth, about 1·5 cm. long .. .. .. 1. *Mannii*

Leaves acute at the base, ovate-oblong, acute or obtuse, up to 7 cm. long and 4 cm. broad, glabrous ; flowers about 10 in an umbel ; peduncle 8 mm. long ; pedicels 1 cm. long ; sepals subulate, pilose, 1 mm. long .. .. .. 2. *bicoronata*

1. **A. Mannii** *N.E.Br.*—F.T.A. 4, 1 : 416. A strong climber, glabrous, with greenish-yellow (?) flowers in globose axillary umbels, and smooth fruit-follicles 6–8 in long, ½ in. thick, tapering to a short hooked point.
S. Nigeria : Akassa ! Also in Cameroons and Spanish Guinea. Exsicc.—*Dutton* 32.
2. **A. bicoronata** *N.E.Br.*—F.T.A. 4, 1 : 416.
West Africa : probably Sierra Leone. Exsicc.—*Afzelius*.

### 27. **DALZIELIA** Turrill in Hook. Ic. Pl. t, 3061 (1916).

A shrub ; branchlets shortly pubescent ; leaves narrowly linear-oblanceolate, acute, 10–12 cm. long, 1–1·5 cm. broad, glabrous, with several distinct lateral nerves below ; pedicels slender, 2 cm. long ; sepals subulate-lanceolate, 4–5 mm. long, minutely ciliate ; corolla 5-lobed to the middle, 8 mm. long, lobes ovate.. .. *oblanceolata*

**D. oblanceolata** *Turrill* l.c. *Xysmalobium graniticolum* A. Chev. Bot. 432, name only. Erect shrub 2–3 ft. high, possibly sometimes sarmentose, with greenish-white and purple flowers ⅜ in. across in axillary shortly-pedunculate umbels ; habitat on rocks especially in river-beds.

French Guinea : between the Santa and Timbo (Mar.) ! Between Timbo and the Upper Niger (May) ! Sierra Leone : Charlotte Falls (Mar.) ! York Pass (June) ! Bandajuma (May) ! Makump (July) ! Exsicc.—*Dalz.* 1000. *Lane-Poole* 50 ; 440. *Aylmer* 74. *N. W. Thomas* 933. *Chev.* 12609 ; 13596.

### 28. **SPHAEROCODON** Benth.—F.T.A. 4, 1 : 411.

Stems from a woody rhizome, softly pubescent ; leaves oblong-lanceolate to elliptic, 5–10 cm. long, 1·5–6 cm. broad, pubescent on the nerves ; peduncles about 2 cm. long, softly pubescent ; pedicels 1 cm. long ; sepals oblong-lanceolate, pubescent ; corolla about 8 mm. long, 5-lobed, glabrous or minutely pubescent outside *obtusifolium*

**S. obtusifolium** *Benth.* in Hook. Ic. Pl. 12 : 78, t. 1190.—F.T.A. 4, 1 : 412. Suberect or twining, 1–3 ft., branching only at the base, with obliquely-nerved leaves and dark purple flowers in interpetiolar umbels.

N. Nigeria: Kontagora, Kotonkoro (June) ! Abinsi (July) ! Extends to Angola, E. Africa and Natal. Exsicc.—*Dalz.* 552 ; 687.

### 29. **CEROPEGIA** Linn.—F.T.A. 4, 1 : 435.

Leaves linear to narrowly lanceolate or much reduced ; stems mostly short and erect :
Corolla-lobes with intermediate long-subulate lobes ; tube 4–7 cm. long, narrow in the middle, mottled in the upper half ; lobes linear or linear-filiform, 4–6 cm. long ; leaves linear or narrowly linear-lanceolate, 5–8 cm. long, up to 8 mm. broad, with distinct ascending lateral nerves .. .. .. .. .. 1. *Ledermannii*
Corolla-lobes without intermediate lobes or the latter very short and tooth-like :
Corolla-tube 1–2 cm. long ; stems climbing :
Corolla-lobes without or with very few purplish setae :
Leaves linear-lanceolate, 3–4 cm. long, abruptly apiculate, scabrid above ; petiole distinct ; corolla-lobes broadly linear, 1 cm. long .. .. 2. *pedunculata*
Leaves very narrowly linear or subfiliform, about 4 cm. long, minutely scabrid ; petiole absent ; corolla-lobes narrowly linear, minutely pubescent, and with a few long purplish processes .. .. .. .. .. 3. *Deightonii*
Corolla-lobes very densely covered with purple setae, about 6 mm. long ; leaves linear .. .. .. .. .. .. .. .. .. 4. *tourana*
Corolla-tube 3 cm. long or more ; stems mostly short and erect :
Plants leafy at flowering time :
Corolla-lobes 3–4 cm. long :
Corolla-lobes with a long narrowly triangular base, linear, about 4 cm. long ; tube with a long narrow " waist ", glabrous outside the upper part, not mottled 5. *Dalzielii*
Corolla-lobes with a fairly long triangular base, linear, 4 cm. long ; tube with a long narrow " waist," pubescent outside the upper part, mottled 6. *Hepburnii*
Corolla-lobes with a very short triangular base, filiform, about 3 cm. long ; tube with a very short " waist," pilose outside the upper part, not mottled 7. *abinsica*

Corolla-lobes 8–9 cm. long, tube 5 cm. long, constricted in the middle, glabrous outside, mottled in the upper part ; leaves lanceolate, acute, about 9 cm. long and 2 cm. broad, shortly pubescent below .. .. .. 8. *tamalensis*

Plants leafless or nearly so at flowering time ; corolla-lobes linear, about 4–6 cm. long, tube 4–7 cm. long, with a gradually narrowed " waist " :

Corolla-tube minutely pubescent outside, very slender.. .. 9. *porphyrotricha*

Corolla-tube glabrous outside, fairly wide at the base and apex, about 6 cm. long 10. *Kerstingii*

Corolla-tube glabrous outside, medium-wide at the base, 2·5 cm. long, lobes linear, pubescent inside ; leaves linear, 3 cm. long .. .. .. 11. *campanulata*

Leaves ovate or ovate-elliptic ; stems usually climbing :

Corolla-lobes free at the tips, short and spreading in the open flower :

Corolla-lobes narrowly triangular, nearly as broad as long ; tube about 8 mm. long, densely pubescent ; leaves rounded or cordate at the base, setulose above, shortly pubescent below .. .. .. .. .. .. .. .. 12. *nigra*

Corolla-lobes oblong, longer than broad ; tube about 1 cm. long, thinly pubescent ; leaves cordate at the base, sparingly setulose above, thinly pubescent below 13. *kroboensis*

Corolla-lobes connate into a slender column terminating in a stigma-like ellipsoid head, column about 8 mm. long ; tube 1·5 cm. long, globose-ellipsoid at the base ; leaves ovate-lanceolate .. .. .. .. .. .. 14. *rhynchantha*

Corolla-lobes connate or coherent at the tips only :

Sepals 2 cm. long, linear-subulate ; corolla-tube cylindric for 2·5 cm., then expanded ; lobes 1·5 cm. long ; leaves ovate, long-tailed-acuminate, nearly glabrous 15. *Talbotii*

Sepals up to 5 mm. long :

Leaves pilose or pubescent on the nerves below :

Leaves densely pilose on the nerves below, subulate-acuminate, mostly cordate at the base ; corolla-tube cylindric, 2·5 cm. long, lobes 1·4 cm. long 16. *Johnsonii*

Leaves thinly pubescent on the nerves below, subulate-acuminate ; corolla-tube 2 cm. long, curved, lobes 4 cm. long .. .. .. .. 17. *Peulhorum*

Leaves glabrous below :

Corolla-lobes with a fringe of long hairs at the apex, about 8 mm. long ; tube 1·5 cm. long ; sepals 2·5 mm. long ; leaves obovate-oblanceolate, acutely acuminate, 4–7 cm. long .. .. .. .. .. .. 18. *anceps*

Corolla-lobes without long hairs at the apex :

Corolla-lobes glabrous inside, broadly lanceolate :

Corolla-tube 3 cm. long ; leaves elliptic, very acutely long-mucronate-acuminate, about 6 cm. long and 3·5 cm. broad ; flowers on a short axis, the base of the pedicel callous-like after flowering .. .. .. .. 19. *fusiformis*

Corolla-tube 1·5 cm. long, gibbous at the base ; leaves as above, but long- and narrowly triangular-acuminate ; flowers fasciculate at the end of the peduncle 20. *aristolochioides*

Corolla-lobes pilose inside, linear, 1 cm. long ; tube 1·5–2·5 cm. long, mottled towards the apex ; sepals narrowly lanceolate, glabrous :

Leaves small, ovate, very acute, not cordate .. .. 21. *gemmifera*

Leaves ovate-rounded, very acute, cordate at the base .. 22. *yorubana*

1. **Ceropegia Ledermannii** *Schlechter* in Engl. Bot. Jahrb. 51 : 154 ; Hutch. in Kew Bull. 1921 : 387, fig. 9. Erect herb 6–12 in. high with an underground discoid tuber about 2 in. in diameter, and purple-mottled tubular flowers with long green thread-like lobes.

N. Nigeria : Bauchi Plateau, Takwara, 3,200 ft. (May) ! Vom, 3,000–4,500 ft. ! Also in N. Cameroons. Exsicc.—*Lely* 110. *Dent Young* (no number).

2. **C. pedunculata** *Turrill* in Kew Bull. 1921 : 389. *C. atacorensis* A. Chev. Bot. 439. *C. gourmaca* A. Chev. l.c. A slender twiner with glabrous stems and flowers 1½ in. long, orange or brown-purple with paler corolla-lobes ; fruit follicles very narrow, 3 in. long (immature).

French Sudan : Gourma and Mossi, several localities (July, Aug.) ! N. Nigeria : Gola Prov., Goila, and Kilba (Aug.) ! Bauchi Plateau, Naraguta (Aug.) ! Also in Cameroons. Exsicc.—*Dalz.* 96. *Lely* 495. *Chev.* 24477 ; 24489 ; 24626 ; 24689 ; 24732.

3. **C. Deightonii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Slender stemmed, apparently twining, with flowers 1½ in. long, the corolla-lobes deep purple with short hairs.

Sierra Leone : Waterloo (Aug.) ! Binkolo, on granite (Aug.) ! Exsicc.—*Deighton* 1289 ; 2057.

4 **C. tourana** *A. Chev.* Bot. 439, name only. Erect 15 in. high, probably from a tuber, with deep purple flowers ¾ in. long, and slender fruit follicles 10 in. long.

Ivory Coast : Upper Sassandra, Toura country, near Gouekouna village, 2,400–2,700 ft. (May) ! Exsicc.—*Chev.* 21653.

5 . **C. Dalzielii** *N.E.Br.* in Kew Bull. 1913 : 302. Herb 1 ft. or more high from a small discoid tuber, with flower dilated at base and top, deep purple in the lower part.

N. Nigeria : Worutawara, near Abinsi (June) ! Exsicc.—*Dalz.* 689.

6. **C. Hepburnii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Erect herb from a tuber, with flower 3 in. long including the corolla-lobes, " white with light purple spots, the lobes of petals dark purple on inner surface."

N. Nigeria : Randa, Nassarawa, on rocky hills, 2,000 ft. (May) ! Exsicc.—*Hepburn* 57.

7. **C. abinsica** *N.E.Br.* in Kew Bull. 1914 : 168. Erect, simple or branched, from a discoid or globose tuber, with slightly pubescent stems sometimes fairly stout up to 2 ft. or more high, and flowers 2½ in. long green-purple at the waist, with purple streaks.

N. Nigeria: Abinsi, in grass, fairly common (July)! Randa, Nassarawa, on hills (May)! Exsicc.—*Dalz.* 690. *Hepburn* 62.

8. **C. tamalensis** *W. W. Smith* in Notes Roy. Bot. Gard. Edinb. 13 : 308. Erect herb from a discoid tuber, with flowers 2 in. long in the tubular part, green with purple lines and blotches, plicate in the mouth, the lobes linear 3 in. or more long, purple, pendulous.
Gold Coast: Tamale, in sandy soil over rock (June)! Exsicc.—*Dalz.* 60 (partly).

9. **C. porphyrotricha** *W. W. Smith* l.c. 307. Erect about 1 ft. high, simple, from a discoid tuber, with flowers 3–4 in. long, green and deep purple including the erect linear lobes, the lower part of the tube only slightly dilated, the base of the lobes fringed with dark purple hairs; in the leafy state one pair of leaves is much larger than the others.
Gold Coast: Tamale, with the preceding! Exsicc.—*Dalz.* 60 (partly).

10. **C. Kerstingii** *K. Schum.* in Engl. Bot. Jahrb. 33 : 326; Chev. Bot. 439? Erect, 6–8 in. high, from a tuber, slightly pubescent, with dull purple flower 4 in. long including the lobes, white and brown spotted in the throat.
French Sudan: Gourma! Togo: Aledjo, 2,400 ft. (Feb.)! Dahomey: Djougou and Kouandé! Exsicc.—*Kersting* 307.

11. **C. campanulata** *G. Don*—F.T.A. 4, 1 : 462. Erect, 6 in. high, from a tuber, with dark purple-brown flower 2 in. long including the corolla-lobes.
Gold Coast: Accra! Exsicc.—*Don.*

12. **C. nigra** *N.E.Br.*—F.T.A. 4, 1 : 440. A pubescent twiner with flowers in umbel-like cymes ½–⅔ in. long, the corolla-tube curved above the obliquely inflated base, the lobes dark blue-green, turning black.
N. Nigeria: ? locality, on the Niger, probably Lokoja! Exsicc.—*Baikie.*

13. **C. kroboensis** *N.E.Br.*—F.T.A. 4, 1 : 440. A pubescent twiner like the last but with straight flowers.
Gold Coast: Krobo Plains (Nov.)! Exsicc.—*Johnson* 790.

14. **C. rhynchantha** *Schlechter* in Engl. Bot. Jahrb. 51 : 155. A slender, perennial twiner with glabrous stems and peduncled cymes of green and red-mottled flowers 1–1¼ in. long including the club-topped connate corolla-lobes.
N. Nigeria: Bauchi Plateau, Naraguta, amongst rocks (Aug.)! Also in N. Cameroons. Exsicc.—*Lely* 523; 550.

15. **C. Talbotii** *S. Moore* in Cat. Talb. Nig. Pl. 65. A nearly glabrous twiner, usually leafy, with flowers 2 in. long, dirty white with purple blotching.
S. Nigeria: Oban! Eket! Exsicc.—*Talb.* 116; 3357.

16. **C. Johnsonii** *N.E.Br.*—F.T.A. 4, 1 : 451. A twiner with fairly stout, half-succulent, glabrous stems, and flowers 1½–2 in. long, whitish or green with purple blotches, the tube slightly curved.
Gold Coast: Aburi (July)! Exsicc.—*Johnson* 768; 1055.

17. **C. Peulhorum** *A. Chev.* in Journ. de Bot. 22 : 118. Habit of the last, rather slender stemmed, glabrous, with dull mottled purple or almost black-purple flowers 2 in. or more long including the linear lobes; fruits narrow, paired, 3–5 in. long.
French Guinea: Futa-Jallon, Timbo, on bushes amongst rocks (Sept.)! Sierra Leone: Mt. Aureole! Hill Station (Oct.)! Mabum (Aug.)! Exsicc.—*Chev.* 18395. *Litchford.* *N. W. Thomas* 1608. *Deighton* 148.

18. **C. anceps** *S. Moore* in Cat. Talb. Nig. Pl. 66. A glabrous leafy climber, with flowers in short-pedunculate cymes, creamy-white and blotched on the tube, the lobes dark purple.
S. Nigeria: Oban! Calabar! Exsicc.—*Talb.* 174. *H. B. Lloyd.*

19. **C. fusiformis** *N.E.Br.*—F.T.A. 4, 1 : 450. A glabrous twiner with curved flowers 1¾ in. long, sub-umbellate (at first) on a peduncle 1–1½ in. long, greenish-white, purple at the base; fruit narrow, 8 in. long.
Gold Coast: Krobo Plains (fr. Dec.)! Odumasi (Aug.)! Anum (Dec.)! S. Nigeria: Abeokuta! Exsicc.—*Johnson* 499; 1075. *Millen* 89. *Plumptre* 31.

20. **C. aristolochioides** *Decne.*—F.T.A. 4, 1 : 464; Chev. Bot. 438. *C. Perrottetii* N.E.Br.—F.T.A. 4, 1 : 448. A glabrous half-succulent twiner, with flowers clustered at the end of a peduncle scarcely 1 in. long, dark purple and mottled, about 1 in. long.
French Sudan: Gourma and Mossi, several localities (July, Aug.)! Sierra Leone: Ronietta (Nov.)! Yonibana (Oct.)! Kanya (Oct.)! Mamaka (Nov.)! Mabonto (Oct.)! Exsicc.—*N. W. Thomas* 2981; 3561; 3982; 4434; 5561. *Chev.* 24499; 24576; 24686; 24782.

21. **C. gemmifera** *K. Schum.* in Engl. Bot. Jahrb. 33 : 328. A half-succulent twiner, usually with few leaves, and lurid purple mottled flowers 1½ in. long, and narrow fruit-follicles 4–5 in. long.
Gold Coast: Labadi, near Accra (July)! Togo: near Lome (Sept.)! Exsicc.—*Dalz.* 153. *Warnecke* 242. *Schlechter.*

22. **C. yorubana** *Schlechter* in Engl. Bot. Jahrb. 38 : 48. A glabrous climber usually leafy, with flowers about 1 in. long.
S. Nigeria: between Ibadan and Abeokuta (Mar.)! Exsicc.—*Schlechter* 13016.

## 30. LEPTADENIA R.Br.—F.T.A. 4, 1 : 430.

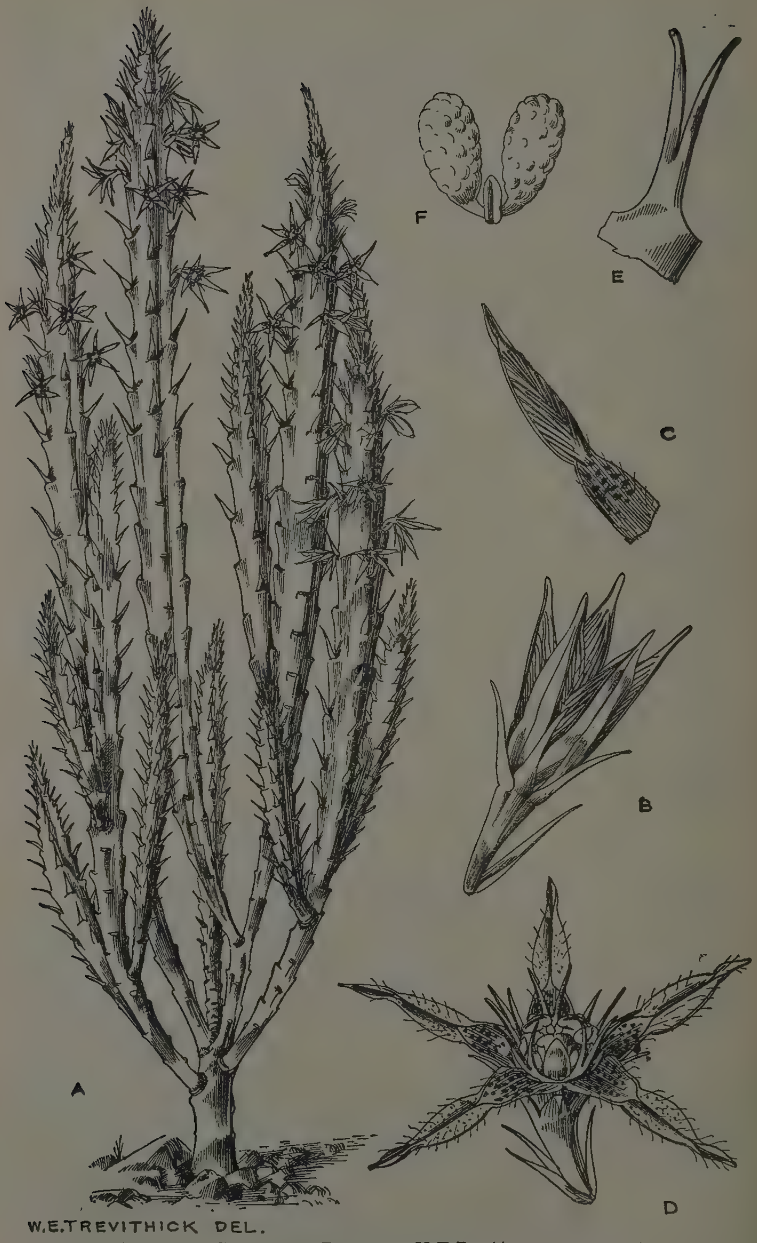
Leafy twiners:
- Corolla 5–6 mm. long; leaves very variable, from linear to broadly ovate, rounded at the base; pedicels 2–4 mm. long, tomentellous; sepals and corolla outside tomentellous; fruit about 10 cm. long, lanceolate, smooth .. .. 1. *lancifolia*
- Corolla about 2 mm. long, ovate and rounded to linear and hastate at the base; pedicels about 5 mm. long, slender, puberulous; sepals and corolla outside puberulous; fruit as above but shorter and narrower .. .. .. 2. *heterophylla*

Leafless shrubs with whip-like branches, rarely with small leaves on the young shoots; peduncles very short; pedicels tomentellous 1–2 mm. long; sepals and corolla outside shortly pubescent; fruits very narrow, long-beaked, about 12 cm. long, closely grooved .. .. .. .. .. .. .. .. 3. *Spartium*

1. **Leptadenia lancifolia** *Decne.*—F.T.A. 4, 1 : 430; Holl. 3 : 466; Chev. Bot. 437. A twiner or prostrate from a woody base, minutely pubescent, with greenish viscid sap, and yellow-green flowers ¼ in. long in short lateral umbels; follicles 3 in. or more long, obtusely beaked, glabrous.
Senegal and French Sudan to N. Nigeria, common! Gold Coast: Accra Plains! S. Nigeria: Oyo (May)! Lagos Colony! From Mauritania to E. Sudan, Upper Nile land and Lake Albert. Exsicc.—*Roger.* *Döllinger* 60. *Brunner.* *E. Vogel* 25. *Barter* 3336. *Millson* 90. *Rowland.* *Brown* 309. *Elliott* 110. *Dalz.* 7; 95. *Debeaux* 181. (See Appendix).

2. **L. heterophylla** *Decne.*—F.T.A. 4, 1 : 431. A nearly glabrous twiner with the habit of the preceding, with smaller whitish flowers in lateral umbels.
N. Nigeria: Katagum (Nov.)! Bure, near Lake Chad (Dec.)! Extends to E. Sudan, the Red Sea and Upper Nile land. Exsicc.—*Elliott* 112. *Dalz.* 96.

[illegible] **L. Spartium** *Wight*—F.T.A. 4, 1 : 432; Chev. Bot. 438. A leafless bush with pale green branchlets, up to 5–10 ft. high.
Mauritania and Senegal: common! French Sudan: Timbuktu (July)! Korioumé (July)! N. Nigeria: common in the Chad area! Extends through Nubia and Arabia to India. Exsicc.—*Roger.* *Heudelot* 482. *Leprieur.* *E. Vogel* (no number). *Elliott* 116. *Foster* 93. (See Appendix).


A
B
C
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E
F
W.E.TREVITHICK DEL.

FIG. 197.—CARALLUMA DALZIELII *N.E.Br.* (ASCLEPIADACEAE).

A, whole plant. B, opening flower-bud. C, corolla-lobe. D, flower. E, corona-lobe. F, pollinia.

### **31. BRACHYSTELMA** R.Br.—F.T.A. 4, 1 : 466.

Flowers on long pedicels ; stems soon glabrous or nearly so ; leaves variable, oblanceolate to ovate-elliptic, rounded or subacute at the apex, broadly and shortly cuneate at the base, 4–7 cm. long, up to 3·5 cm. broad, pubescent below ; calyx-lobes lanceolate, softly pubescent, 1·5 mm. long ; corolla 8 mm. long, puberulous outside 1. *Bingeri*

Flowers on very short pedicels in a cluster ; stems softly pubescent ; leaves broadly oblanceolate, subacute, narrowed to the base, 4–6 cm. long, about 2 cm. broad, shortly pubescent on both surfaces ; calyx-lobes narrowly ovate ; corolla about 7 mm. long, glabrous outside.. .. .. .. .. .. 2. *atacorensis*

1. **B. Bingeri** *A. Chev.* in Rev. Cult. Colon. 8 : 67, with fig.—F.T.A. 4, 1 : 469. A perennial herb from a succulent tuber, with stems slightly branched up to 1 ft. high.
French Sudan : between Zamblara and Tiédiana, common in the bush (June) ! Diondiou to Zongatory ! San ! Dahomey : Kouandé to Konkobiri and Guilimaro ! Exsicc.—*Chev.* 992 ; 1015 ; 2703 ; 24251. (See Appendix).
2. **B. atacorensis** *A. Chev.* Bot. 439. Perennial herb from a tuber, branching low, 6–8 in. high.
Dahomey : Atacora Mts., Kouandé, 1,200–1,500 ft. (June) ! Exsicc.—*Chev.* 24013.

### **32. CARALLUMA** R.Br.—F.T.A. 4, 1 : 477.

Stems angular or ribbed :
  Stems fleshy, angular ; leaves rudimentary, subulate-lanceolate, acute, about 4 mm. long ; flowers solitary or paired, shortly pedicellate :
    Sepals subulate-lanceolate, very acute, 4 mm. long, glabrous ; corolla-lobes narrowly lanceolate, 4–5 mm. long, pilose inside with purplish hairs ; outer corona-lobes deeply bipartite .. .. .. .. .. .. .. .. 1. *Dalzielii*
    Sepals lanceolate, 2 mm. long ; corolla campanulate, 1·5 cm. long, lobes narrowly triangular, not pilose inside .. .. .. .. .. .. 2. *edulis*
  Stems fleshy, 4-ribbed ; leaves subulate-lanceolate, about 1 cm. long ; flowers axillary towards the end of the shoot ; pedicels very short ; calyx-lobes narrowly lanceolate, 2 mm. long .. .. .. .. .. .. .. 3. *Decaisneana*
Stems broadly winged (like a fleshy *Euphorbia*), wings fleshy, undulate, toothed, about 1·5 cm. broad ; flowers in a dense terminal cluster ; pedicels 1–2 cm. long, glabrous ; bracts filiform ; calyx-lobes linear ; corolla about 1·3 cm. diam., lobes broadly ovate, ciliate with long purple hairs ; fruit narrowly lanceolate, 10–12 cm. long 4. *tombuctuensis*

1. **C. Dalzielii** *N.E.Br.* in Kew Bull. 1912 : 280 ; Holl. 3 : 466. A succulent plant with stems simple or branched from a hard base, a few inches to 1 ft. or more high, and small dark red-purple flowers.
N. Nigeria : Sokoto, on rocky hills (July) ! Katagum (cultivated) ! Exsicc.—*Dalz.* 317 ; 367. (See Appendix).
2. **C. edulis** *A. Chev.* Bot. 440, name only.
Mauritania : Tidjikja, in sandy-clay soil (Sept.) ! Exsicc.—*Charles* in *Herb. Chev.* 28733.
3. **C. Decaisneana** *N.E.Br.*—F.T.A. 4, 1 : 488 ; Chev. Bot. 440. Erect, succulent simple or sparingly branched with prominent angles on the ribbed stems, and small star-shaped dark red-purple flowers.
Mauritania : Tichoten ! French Sudan : Djenné, on dunes (July) ! Senegal : St. Louis ! Exsicc.—*Chev.* 1145 ; 3489. *Charles* in *Herb. Chev.* 28690.
4. **C. tombuctuensis** *N.E.Br.*—F.T.A. 4, 1 : 622 ; Chev. Bot. 440. *Boucerosia tombuctuensis* A. Chev. in Actes Congr. Intern. Bot. Paris, 1900 : 271 and 261, t. 11. Erect, branched, 4-angled, up to 4 ft. or more high, with rotate-funnel-shaped blackish-purple flowers.
French Sudan ; dunes near Timbuktu and Arnassay (July) ! Exsicc.—*Chev.* 1317 ; 1318. (See Appendix)

## 123. RUBIACEAE

Trees, shrubs or rarely herbs. Leaves opposite or rarely verticillate, entire ; stipules inter- or intra-petiolar, often connate, rarely leafy and not distinguishable from the leaves. Flowers usually hermaphrodite, actinomorphic or very rarely slightly zygomorphic, solitary to capitate. Calyx adnate to the ovary. Corolla epigynous, more or less tubular, rarely campanulate ; lobes 4–12, contorted, imbricate or valvate. Stamens epipetalous, as many as and alternate with the corolla-lobes ; anthers mostly separate, 2-celled, opening lengthwise or rarely by terminal pores, rarely transversely septate. Ovary inferior, 2- or more-celled, with axile, apical or basal placentas, or rarely 1-celled with parietal placentas ; style often slender ; ovules 1 to many. Fruit a capsule, berry or drupe. Seeds rarely winged, mostly with endosperm, the latter rarely ruminate ; embryo straight or curved.

A very large and mostly tropical family, the herbaceous representatives largely in temperate regions. Recognised at once in the *Metachlamydeae* (*Gamopetalae*) by the inferior ovary, regular corolla, separate anthers, and stipulate simple *entire* leaves. *Gaertnera* (q.v.), in this Flora included in the *Loganiaceae*, is closely allied to *Psychotria*, and forms a link between the two families ; but its ovary is superior.

## *Key to the Tribes.*

*Corolla-lobes contorted ; trees, shrubs or climbers ; flowers never in globose heads :

Ovules 2 or more in each ovary-cell :

Fruit a capsule ; seeds winged
I. Cinchoneae

Fruit a berry or dry and indehiscent ; seeds not winged :

Inflorescence elongated, spike-like
V. Hamelieae

Inflorescence corymbose or flowers solitary
II. Gardenieae

Ovule solitary in each ovary-cell :

Ovule pendulous from near the top of the cell
III. Alberteae

Ovule erect from near the base or peltately attached near the middle of the cell
IV. Ixoreae

**Corolla-lobes imbricate ; trees or shrubs :

Flowers not in globose heads
V. Hamelieae

Flowers in globose heads
VI. Naucleae

***Corolla-lobes valvate ; trees, shrubs or herbs :

†Ovules 2 or more in each ovary-cell ; flowers sometimes in globose heads :

Fruit a capsule or dicoccous ; seeds winged or appendaged :

Trees or shrubs :

Flowers not in globose heads, in lax panicles or spike-like cymes
I. Cinchoneae

Flowers in globose heads
VI. Naucleae

Herbs or very small shrublets
XI. Hedyotideae

Fruit a berry or dry and indehiscent
VII. Mussaendeae

††Ovule solitary in each ovary-cell :

Ovule pendulous from near the top of the cell flowers never in heads :

Woody plants
VIII. Vanguerieae

Herbs
XI. Hedyotideae

Ovule erect from near the base or peltately attached towards the middle of the cell :

Stipules not leaf-like :

Calyx-tubes confluent ; flowers in heads ; fruits more or less united into a mass
IX. Morindeae

Calyx-tubes not confluent :

Flowers hermaphrodite :

Ovule attached to the base of the cell ; mostly trees or shrubs ; flowers cymose or capitate
X. Psychotrieae

Ovule attached to the septum of the ovary ; herbs, mostly with glomerate axillary flowers
XII. Spermacoceae

Flowers unisexual
XIII. Anthospermeae

Stipules leaf-like, the " leaves " verticillate ; herbs or herbaceous climbers
XIV. Galieae

### Tribe I.—Cinchoneae.

Corolla-lobes contorted ; flowers numerous in dense terminal corymbs ; stamens exserted ; style long-exserted, stigma ellipsoid ; seeds with a jagged wing all round
1. **Crossopteryx**

Corolla-lobes valvate :

Flowers in a simple or slightly branched spike-like raceme ; corolla-lobes not appendaged ; some of the bracts enlarged and more or less petaloid 2. **Hymenodictyon**

Flowers paniculate :

Corolla-lobes with linear appendages ; capsule septicidal .. 3. **Paucinystalia**

Corolla-lobes with orbicular appendages ; capsule loculicidal .. 4. **Corynanthe**

### Tribe II.—Gardenieae.

Anthers transversely locellate ; flowers rather large in terminal cymes ; stipules large and persistent ; corolla-lobes overlapping to the left .. .. 5. **Dictyandra**

Anthers not locellate :
Ovary 1-celled, with parietal placentas :
Inflorescence axillary, cymose, few-flowered .. .. .. 6. **Mitriostigma**
Inflorescence or solitary flowers terminal :
Stigma capitate, long-exserted ; flowers in clusters ; corolla hirsute ; anthers exserted .. .. .. .. .. .. .. .. 7. **Macrosphyra**
Stigma club-shaped ; flowers often sessile ; anthers included .. 8. **Gardenia**
Ovary 2- or more-celled, with axile placentas (see also *Gardenia*) :
Calyx-lobes open in bud :
Style entire or at most dentate at the apex or branches connivent :
Inflorescence or solitary flowers terminal :
Corolla-tube not split down one side :
Flowers solitary or few together ; ovary usually 2-celled ; corolla usually 5-lobed .. .. .. .. .. .. .. .. .. 12. **Randia**
Flowers numerous in a dense sessile terminal cluster ; corolla 6–8-lobed ; leaves large and sessile .. .. .. .. .. 9. **Schumanniophyton**
Flowers numerous in a loose corymb ; leaves small and petiolate 10. **Tarenna**
Corolla-tube split down one side, the style protruding through the slit ; cymes very few-flowered .. .. .. .. .. .. 11. **Dorothea**
Inflorescence or solitary flowers axillary :
Ovules numerous :
Calyx-tube truncate, toothed or shortly lobed :
Flowers mostly solitary ; corolla-tube not very slender .. .. 12. **Randia**
Flowers cymose ; corolla-tube very slender .. .. .. 13. **Oxyanthus**
Calyx deeply lobed ; fruit narrowed at the base .. .. 6. **Mitriostigma**
Ovules 2–4, impressed on the large fleshy placentas ; ovary 4-celled 14. **Morelia**
Style divided into two spreading branches :
Anthers sessile or subsessile :
Flowers axillary, precocious .. .. .. .. .. .. 15. **Feretia**
Flowers paniculate, not precocious .. .. .. .. 16. **Pouchetia**
Anthers with fairly long filaments ; flowers small in axillary clusters ; epicalyx single or double, often cupular .. .. .. .. .. 17. **Tricalysia**
Calyx-lobes contorted in bud :
Flowers axillary, solitary or very few ; corolla-tube broad .. 18. **Amaralia**
Flowers in dense terminal cymes ; corolla-tube narrow.. .. 19. **Leptactina**

### Tribe III.—Alberteae.

Corolla glabrous inside the throat ; style divided :
Calyx short ; corolla glabrous or slightly puberulous outside .. 20. **Belonophora**
Calyx oblong, sulcate ; corolla silky outside.. .. .. .. 21. **Aulacocalyx**
Corolla densely hairy inside the throat ; style not divided :
Corolla-lobes 5–6 ; stamens 5–6, exserted from the corolla-tube .. 22. **Cremaspora**
Corolla-lobes 4 ; stamens 4, included in the corolla-tube .. .. 23. **Polysphaeria**

### Tribe IV.—Ixoreae

Bracteoles not connate into an epicalyx :
Style usually divided ; endosperm not ruminate ; ovules attached near the middle of the axis :
Style shortly exserted ; upper leaves often bract-like and ovate .. 24. **Ixora**
Style far-exserted ; upper leaves not bract-like .. .. .. 25. **Pavetta**
Style included in the corolla-tube ; calyx-lobes accrescent .. 26. **Psilanthus**
Style not divided ; endosperm ruminate ; ovules inserted on the small fleshy placentas ascending from the base of the ovary .. .. .. .. 27. **Rutidea**
Bracteoles connate into a cupular epicalyx ; seeds with a longitudinal furrow on one side .. .. .. .. .. .. .. .. .. 28. **Coffea**

### Tribe V.—Hamelieae

Corolla-lobes contorted ; inflorescence elongated .. .. .. 29. **Bertiera**
Corolla-lobes imbricate ; inflorescence not elongated :
Peduncle not adnate to the petiole ; shrubs.. .. .. .. 30. **Heinsia**
Peduncle adnate to the petiole ; climbers .. .. .. .. 31. **Atractogyne**

### Tribe VI.—Naucleae

Calyx-tubes not confluent ; fruit a capsule ; corolla valvate :
Branches without spines ; flowers subtended by chaffy bracteoles :
Calyx distinctly lobed.. .. .. .. .. .. .. .. 32. **Adina**
Calyx truncate or obscurely toothed .. .. .. .. 33. **Mitragyna**
Branches with spines ; bracteoles absent .. .. .. .. 34. **Uncaria**
Calyx-tubes confluent in fruit ; fruit a fleshy syncarp ; corolla imbricate 35. **Sarcocephalus**

### Tribe VII.—Mussaendeae

Inflorescence terminal, often one of the calyx-lobes of the outer flowers enlarged and petaloid .. .. .. .. .. .. .. .. 36. **Mussaenda**

Inflorescence axillary :

Inflorescence not enclosed in bracts :

Calyx-teeth minute .. .. .. .. .. .. .. 37. **Urophyllum**

Calyx-lobes not minute, not clawed .. .. .. .. 38. **Sabicea**

Inflorescence enclosed in one or two large bracts .. .. .. 39. **Stipularia**

### Tribe VIII.—Vanguerieae [1]

Corolla-tube always straight, mostly short, sometimes elongated and narrow :

Corolla narrowly tubular, elongated, 2 cm. long ; stigma capitate, deeply lobed :

Flowers solitary ; corolla-lobes with long filiform appendages ; stigma vertically lobed, shortly exserted .. .. .. .. .. .. 40. **Hutchinsonia**

Flowers cymose, numerous ; corolla-lobes without appendages ; stigma laterally lobed, long-exserted .. .. .. .. .. .. 41. **Robynsia**

Corolla small or medium-sized ; stigma neither capitate nor deeply 3–4-lobed ; flowers rarely solitary, mostly cymose, always axillary :

Flowers solitary or fasciculate or in a sessile cluster (never in branched cymes) :

Leaves verticillate, 3–5-nate ; stems mostly herbaceous, angular, very rarely trees or shrubs ; calyx-limb truncate, irregularly dentate or shortly lobed ; stigma 3–5-lobed .. .. .. .. .. .. .. .. 42. **Fadogia**

Leaves opposite ; shrubs :

Calyx-limb truncate, obsoletely dentate or shortly lobed ; stigma coroniform or sulcate ; style not hairy in the middle .. .. .. 43. **Rytigynia**

Calyx-limb deeply lobed ; stigma capitate ; style with a hairy disk-like part in the middle .. .. .. .. .. .. .. 44. **Globulostylis**

Flowers in umbels or mostly in conspicuously branched inflorescences or in a pedunculate cluster :

Bracts small and inconspicuous ; calyx-lobes small and not accrescent :

Inflorescence umbellate or mostly cymose-corymbose ; flowers as a rule numerous and small ; calyx truncate or minutely denticulate ; style often long-exserted :

Style subentire, calyptriform .. .. .. .. .. 45. **Canthium**

Style bifid, at least at the tips .. .. .. .. 46. **Craterispermum**

Inflorescence cymose-racemose, the ultimate branches always elongated ; flowers usually medium-sized ; calyx-limb mostly spreading, lobed, rarely long-subulate-dentate ; style mostly shortly exserted :

Corolla-throat glabrous ; ovary 2-celled ; stigma mitriform, 2-lobed at the apex ; fruit didymous or by abortion 1-celled .. 47. **Vangueriopsis**

Corolla-throat villous ; ovary 5-celled ; stigma cylindric, obscurely 5-lobed at the apex ; fruit mostly of 5 pyrenes .. .. .. 48. **Vangueria**

Bracts large and foliaceous ; calyx-lobes large and accrescent .. 49. **Cuviera**

Corolla-tube curved, broad and rather long ; stems annual from a rhizome ; calyx-limb truncate .. .. .. .. .. .. .. .. 50. **Temnocalyx**

### Tribe IX.—Morindeae

Only genus .. .. .. .. .. .. .. .. 51. **Morinda**

### Tribe X.—Psychotrieae

Trees or shrubs (or very rarely the woody stems from a rhizome) :

Flowers axillary, fasciculate .. .. .. .. .. .. 52. **Lasianthus**

Flowers terminal, paniculate or capitate :

Flowers (when capitate) not surrounded by an involucre :

Corolla-tube straight, usually short :

Endosperm not ruminate ; ovules smooth :

Shrubs or trees, or if herbaceous, flowers not in heads .. 53. **Psychotria**

Subherbaceous plants, flowers in heads .. .. .. .. 54. **Trichostachys**

Endosperm ruminate ; ovules wrinkled .. .. .. .. 55. **Grumilea**

Corolla-tube curved, rather long .. .. .. .. .. 56. **Chasalia**

Flowers capitate and surrounded by an involucre of bracts .. 57. **Uragoga**

Small creeping herbs ; leaves cordate ; flowers bracteate at the base or in a cup-shaped or hemispherical involucre .. .. .. .. .. .. 58. **Geophila**

### Tribe XI.—Hedyotideae

Anthers opening by longitudinal slits ; fruit usually dehiscing regularly :

Ovules numerous :

Fruit dicoccous ; calyx-lobes unequal, one lobe elongated .. 59. **Otomeria**

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[1] Key adapted from Robyns Tentamen Monogr. Vanguerieae 21 (1928) (Bull. Jard. Bot. Brux. 11 : 21).

Fruit a loculicidal capsule ; calyx-lobes unequal :
Corolla-throat bearded; valves of the capsule persistent .. .. .. 60. **Pentas**
Corolla-throat glabrous ; one valve of the capsule deciduous .. .. 61. **Virecta**
Fruit a capsule or dicoccous ; calyx-lobes equal :
Style-branches not spathulate ; seeds numerous ; stipules ovate or truncate or setose .. .. .. .. .. .. .. .. 62. **Oldenlandia**
Style-branches spathulate ; seeds few ; stipules lanceolate .. 63. **Hekistocarpa**
Ovules solitary in each cell :
Fruit indehiscent ; calyx-lobes unequal .. .. .. .. 64. **Pentanisia**
Fruit dehiscent ; one calyx-lobe enlarged and leafy .. 65. **Neobaumannia**
Anthers opening by terminal pores ; tiny annual herb ; fruit bursting irregularly at the apex .. .. .. .. .. .. .. .. .. 66. **Argostemma**

Tribe XII.—SPERMACOCEAE

Fruit separating into 2 parts, each part remaining indehiscent ; stipules multisetose ; stigma subcapitate ; scabrid herbs .. .. .. .. .. .. 67. **Diodia**
Fruit with one or both of the cocci dehiscent :
Fruit separating vertically into 2 halves :
Calyx-teeth subulate or lanceolate :
Both cocci of the fruit dehiscent at the apex .. .. .. 68. **Borreria**
One coccus indehiscent and retaining the axis or septum, the other opening away from the axis .. .. .. .. .. .. .. 69. **Spermacoce**
Calyx-teeth rounded ; flowers densely crowded in heads within the sheathing stipules ; leaves linear or filiform .. .. .. .. .. .. 70. **Octodon**
Fruit didymous, opening transversely across the middle .. .. 71. **Mitracarpum**

Tribe XIII.—ANTHOSPERMEAE

Flowers diœcious, small, solitary, axillary ; fruit dry, obovoid, dicoccous ; heath-like shrubs or shrublets ; only genus .. .. .. .. 72. **Anthospermum**

Tribe XIV.—GALIEAE

Climbers with hooked hairs, and whorls of linear leaves and stipules 73. **Galium**

### 1. CROSSOPTERYX Fenzl—F.T.A. 3 : 43.

Shoots and leaves varying from glabrous to shortly and softly pubescent ; stipules small ; leaves elliptic to suborbicular, rounded to shortly acuminate, averaging about 7 cm. long, mostly pubescent below ; flowers very numerous in rather dense terminal cymes ; bracts small, linear ; calyx very small ; corolla tomentose, about 8 mm. long ; stamens shortly exserted ; style long-exserted, glabrous, stigma ellipsoid ; fruit subglobose, slightly didymous, reticulate, about 1 cm. diam. ; seeds thin, flat, with a jagged wing all round .. .. .. .. .. .. .. *fefrifuga*

**C. febrifuga** *Benth.* in Hook. Niger Flora 381 ; Chev. Bot. 309. *Rondeletia febrifuga* Afzel. ex G. Don. *R. africana* T. Winterbottom, name only. *C. Kotschyana* Fenzl.—F.T.A. 3 : 44 ; Holl. 3 : 352 ; Chev. Bot. 309. *Tarenna angolensis* Hiern. A small tree up to about 30 ft. of savannah woodlands, with scaly bark, dense cymes of sickly-scented creamy-white flowers and blackish capsular fruits about ⅓ in. in diameter.

Widely spread in tropical Africa. Exsicc.—*Heudelot* 28 ; 397 ; 766. *Hutton.* *Barter* 1197 ; 1233. *Sc. Elliot* 4067a ; 4247 ; 4983 ; 5448 ; 5704 ; 5868. *Elliott* 247. *Farmar* 283. *Anderson* 56. *Foster* 38. *Pobéguin* 199 ; 904. *Chev.* 2030. *Baumann* 384. *Warnecke* 445. *Mildbr.* 7203. *Kersting* I. 45. (See Appendix).

### 2. HYMENODICTYON Wall.—F.T.A. 3 : 42.

Inflorescence not branched, a spike-like raceme ; older branchlets marked with the scars of the fallen leaves, smooth ; leaves obovate, abruptly acuminate, cuneate at the base, 8–12 cm. long, 5–7 cm. broad, softly tomentose to nearly glabrous below, with about 8 pairs of ascending lateral nerves ; raceme with a pair of leafy long-stalked lanceolate reticulate bracts 6–8 cm. long ; ovary and calyx softly pubescent ; corolla very narrow at the base, 5 mm. long ; style long exserted ; fruit narrowly ellipsoid, subobtuse at each end, about 1 cm. long ; seeds with a triangular wing deeply bilobed at one end .. .. .. .. .. .. 1. *floribundum*
Inflorescence usually branched from the base ; leaves glabrous or slightly puberulous on the midrib below :
Leaves obovate or elongate-obovate, 4 cm. broad or more :
Corolla much longer than the calyx, glabrous outside ; leaves obovate, bluntly acuminate, 8–12 cm. long, 4·5–6 cm. broad, glabrous, with about 5 pairs of lateral nerves ; inflorescence up to 15 cm. long ; enlarged bract oblong-lanceolate, 7–10 cm. long, stalked ; calyx-lobes 2 mm. long ; fruits narrowly ellipsoid, 1·5 cm. long ; seeds with linear tails, one tail split to the base .. .. 2. *biafranum*
Corolla much shorter than the calyx, pubescent outside ; leaves elongate-obovate, obtuse, 12–20 cm. long, 5–8 cm. broad ; inflorescence elongated, over 30 cm. long, densely pubescent ; enlarged bract linear-lanceolate ; calyx-lobes rather long 3. *bracteatum*

Leaves oblanceolate, 2–3 cm. broad, 8–10 cm. long, rigid, with about 5 pairs of lateral nerves but no visible tertiary nerves; flowers not seen; pedicels in fruit 6 mm. long; fruit narrowly elliptic, 1·5 cm. long .. .. .. 4. *epidendron*

1. **Hymenodictyon floribundum** *B. L. Robinson* in Proc. Amer. Acad. 45 : 404. *Kurria floribunda* Hochst. & Steud. *H. Kurria* Hochst.—F.T.A. 3 : 42; Chev. Bot. 308. A shrub or small tree 8–10 ft. high, commonly on rocks, with spike-like racemes of small red flowers 3–6 in. long.
French Guinea: Le Labé, at sources of R. Gambia; Diaguissa, 4,200 ft.; Futa-Jallon, Ditinn to Dalaba; Dalaba Plateau. Sierra Leone: summit of Sugar Loaf (Apr.)! Ivory Coast: Upper Cavally, Mt. Momy, 2,500–2,750 ft. (Apr.)! Upper Sassandra, between Soucourala and Sanrou. Gold Coast: Obuasi (Sept.)! Togo: Sokode-Basari! N. Nigeria: Neill's Valley, Bauchi Plateau (June)! S. Nigeria: Lagos Colony, on rocks! Extends to Abyssinia, Rhodesia and Angola. Exsicc.—*Sc. Elliot* 5779. *Rowland. Dawodu* 163. *Lely* 266. *Vigne* 927. *Chev.* 21352. *Kersting* A. 741.

2. **H. biafranum** *Hiern*—F.T.A. 3 : 42. A shrub or small tree up to 35 ft., with purplish inflorescence having 2 pure white long-stalked bracts at the base.
S. Nigeria: Oban! Cameroons Mt. 4,500 ft. (fr. Feb.)! Bibundi (Nov.)! Mopanga! Also in Princes Island. Exsicc.—*Mann* 1194. *Talb.* 213; 256. *Kalbreyer* 183. *Mildbraed* 10651.

[illegible]. **H. bracteatum** *K. Schum.* in Engl. Bot. Jahrb. 23 : 424. A shrub or tree 30–40 ft. high, with yellowish red flower-spikes sometimes 1 ft. long having a pair of large persistent whitish bracts several inches long.
S. Nigeria: Benin City (Apr.)! Also in Cameroons. Exsicc.—*Farquhar* 18; 33.

4. **H. epidendron** *Mildbr.* MS. A tree about 45 ft. high or sometimes epiphytic and smaller.
Fernando Po: north side of St. Isabel Peak! Exsicc.—*Mildbr.* 6431.

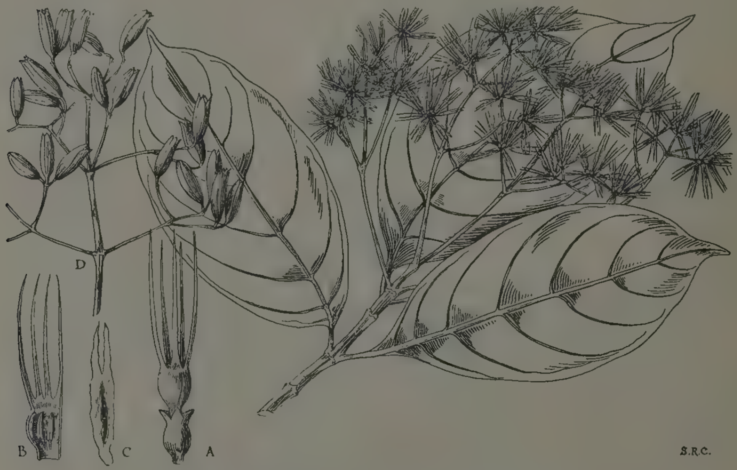

FIG. 198.—PAUSINYSTALIA BRACHYTHYRSA *De Wild.* (RUBIACEAE).
A, flower. B, part of corolla laid open. C, seed.

### 3. **PAUSINYSTALIA** Pierre ex Beille in Act. Soc. Linn. Bordeaux 61 : 130 (1906).

Leaves subcordate at the base, very shortly petiolate:

Leaves oblong-elliptic, very shortly and abruptly acuminate, 10–15 cm. long, 5–8 cm. broad, glabrous, with about 10–14 pairs of lateral nerves and numerous closely parallel tertiary nerves; flowers in subcorymbose panicles, in subsessile clusters; ovary and calyx-lobes puberulous; corolla-lobes linear, nearly 1 cm. long 1. *Lane-Poolei*

Leaves elongate-obovate, narrowed to the auriculate base, very shortly and obtusely acuminate, up to 25 cm. long and 10 cm. broad, prominently venose-reticulate above, with about 15 pairs of lateral nerves; flowers in small paniculate clusters; calyx pubescent inside; corolla-lobes filiform, 1·5 cm. long .. .. 2. *Yohimba*

Leaves more or less cuneate at the acute or subacute base:

Leaves with 10 or more pairs of lateral nerves:

Corolla-lobes stout, 2–3 mm. long; leaves elliptic, broadly acuminate, 12–18 cm. long, 7–8 cm. broad, with numerous parallel tertiary nerves; petiole 1·5–2 cm. long; corymbs rather few-flowered; calyx and ovary glabrous outside; fruit 1·5–2 cm. long; seeds broadly winged at each end, one end split nearly to the base 3. *Sankeyi*

Corolla-lobes slender, about 6 mm. long; ovary and calyx pubescent; leaves oblong, acutely acuminate, 12–13 cm. long, 4–5 cm. broad, with a network of veins between the lateral nerves; petiole 2–3 cm. long; corymbs small .. .. 4. *Talbotii*

Leaves with about 5 pairs of lateral nerves and with a network between, elliptic, shortly acuminate, unequal-sided at the base, 9–11 cm. long, 5–6 cm. broad, glabrous; petiole about 2 cm. long; flowers crowded in small corymbs, subsessile in each cluster; ovary and calyx outside glabrous; corolla-lobes linear-filiform, about 8 mm. long .. .. .. .. .. .. .. .. 5. *brachythyrsa*

1. **Pausinystalia Lane-Poolei** *Hutch. ex Lane-Poole*, Trees, Shrubs, etc. of Sierra Leone 74. *P. reticulata* Hutch., name only. *Corynanthe Lane-Poolei* Hutch. A tree 30–50 ft. high, with copious yellowish white flowers "turning to purplish pink" in panicles in the upper axils.
Sierra Leone: York Pass (June)! Kennema! Liberia: Dukwia R. (Feb.)! Exsicc.—*G. Don. Lane-Poole* 1; 46; 468. *G. P. Cooper* 143; 278. (See Appendix).
2. **P. Yohimba** *Pierre ex Beille* in Act. Soc. Linn. Bordeaux, 61: 130 (1906). *Corynanthe Yohimba* K. Schum.
S. Nigeria! Exsicc.—*Kennedy* 291. (See Appendix).
3. **P. Sankeyi** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. A forest tree with straight bole or sometimes low-branching.
S. Nigeria: Ondo forests, abundant! Exsicc.—*Sankey* 1; 2. (See Appendix).
4. **P. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 40. A tree, glabrous except for the inflorescence, with whitish flowers about ⅓ in. long in subcorymbose panicles.
S. Nigeria: Oban! Odot, Eastern Province (Mar.)! Exsicc.—*Talbot* 1493. *Unwin* 10.
5. **P. brachythyrsa** *De Wild.* in Ann. Soc. Sci. Brux. 42, 1: 175. *Corynanthe brachythyrsus* K. Schum. A tall tree up to 60 ft. or more in height, like the last with copious flowers about ½ in. long in a panicle of small head-like corymbs.
S. Nigeria: Oni! Also in Cameroons. Exsicc.—*Sankey* 2. *Kennedy* 276.

## 4. CORYNANTHE Welw.—F.T.A. 3: 43.

Branchlets glabrous, with very short internodes; stipules early deciduous, leaving a very short ciliolate ring; leaves obovate-elliptic, bluntly acuminate, cuneate at the base, 14–20 cm. long, 4–8 cm. broad, glabrous, with 6–10 pairs of lateral nerves, with numerous parallel tertiary nerves; petiole up to 4 cm. long; flowers small, crowded into a panicle, in sessile clusters; ovary glabrous; calyx-lobes ovate-orbicular, very small, pubescent inside; corolla glabrous, very short, the lobes with orbicular appendages conspicuous in bud; anthers and style exserted; fruit 1 cm. long, glabrous; seeds flat, thin, with a long membranous tail at each end *pachyceras*

**C. pachyceras** *K. Schum.* in Notizbl. Bot. Gart. Berlin, 3: 96. *Pausinystalia pachyceras* De Wild. *Pseudocinchona africana* A. Chev. Bot. 308. *C. paniculata* Holl. 3: 352, partly, not of Welw. A tree up to 50 ft. high, with copious panicles of small white flowers turning rusty-brown in drying.
Sierra Leone: Njala (Oct.)! Liberia: Banga (Oct.)! Ivory Coast: Bouroukrou (Dec.–Jan.)! Baoulé-Nord, Nzi (Aug.)! Indénié, Borobo. Gold Goast: Jabo, Upper Wassaw Reserve (fr. June)! Amentia, S. Ashanti (Sept.)! Bodi, West. Prov. (Nov.)! S. Nigeria: Benin! Oban! Tiko (fr. Jan.)! Also in French Cameroons. Exsicc.—*Dennett* 25. *Vigne* 966; 1368. *McAinsh* 391. *Deighton* 1333. *Linder* 1271. *Chev.* 16141; 2271. (See Appendix).

## 5. DICTYANDRA Welw.—F.T.A. 3: 85.

Corolla about 2½ times as long as the calyx, silky-tomentose outside, 3 cm. long; lobes overlapping to the left in bud; calyx-lobes broadly elliptic, about 1 cm. long, with one thickened recurved margin; leaves obovate-elliptic, shortly-acuminate, 12–20 cm. long, 5–9 cm. broad, slightly pubescent in the axils of the nerves below; stipules broadly triangular, 5 mm. long; flowers in lax cymes; anthers transversely locellate; style hairy .. .. .. .. .. .. .. .. 1. *arborescens*

Corolla about 8 times as long as the calyx, slender, appressed-pilose, about 8 cm. long; lobes overlapping to the left; calyx-lobes lanceolate, hardly 1 cm. long, with slightly curled edges; leaves obovate, sharply cuneate at the base, 12–23 cm. long, 6–12 cm. broad, glabrous; stipules semi-orbicular, leafy, 1–1·5 cm. long; flowers rather crowded; anthers locellate .. .. .. .. .. .. 2. *involucrata*

1. **D. arborescens** *Welw.*—F.T.A. 3: 86. A shrub or small tree up to 25 ft. high, with shining dark green foliage, white silky fragrant flowers 1–1½ in. long in cymes, and small guava-like fruits crowned by the leafy calyx.
Sierra Leone: Limba, Bafodeya (Apr.)! Kofiu Mt. (Jan.)! Kennema! Gold Coast: Aburi Hills (Oct.)! Kumasi (fr. Jan.)! Banka (Dec.)! S. Nigeria: near Lagos! Ilesha! Idumuye (Dec.)! Ukunzu (Jan.)! Oban! Degema! Calabar! Extends south to Angola, also in Uganda. Exsicc.—*Thomson* 77. *Rowland* 23. *Sc. Elliot* 4760; 5584. *Johnson* 465. *Foster* 177.
2. **D. involucrata** *Hiern*—F.T.A. 3: 86. A shrub 15–20 ft. high or more or less climbing, with rather broad leaves and long tubular white flowers 3–4 in. long crowded in terminal cymes.
N. Nigeria: Lokoja, Patti (Nov.)! S. Nigeria: Ogwashi (fr. Nov.)! Degema! Oban! Ambas Bay (Dec.)! Also in Cameroons. Exsicc.—*Mann* 2156. *Dalz.* 99. *N. W. Thomas* 2035. *Talb.* 283.

## 6. MITRIOSTIGMA Hochst.—F.T.A. 3: 111.

Branchlets glabrous; leaves broadly oblanceolate, acutely acuminate, very acute at the base, 10–15 cm. long, 3–4·5 cm. broad, glabrous, with about 6–8 pairs of looped lateral nerves and lax venation between; stipules subulate from a broad base, glabrous; cymes axillary, very short and few-flowered; calyx-lobes subulate, 1–1·5 mm. long; corolla 1 cm. long, gradually widened from a cylindric base; fruits oblong-lanceolate in outline, beaked, 3 cm. long; seeds with a fibrous testa
1. *Barteri*

Branchlets glabrous; leaves broadly oblanceolate, broadly acuminate, acute at the base, about 10 cm. long and 3 cm. broad, glabrous, with 5 pairs of lateral nerves; stipules as above; flowers not known; fruit oblong-lanceolate, shortly stipitate, about 4 cm. long, glabrous .. .. .. .. .. .. 2. *subpunctatum*

1. **M. Barteri** *Hook. f.*—F.T.A. 3 : 111. Half-woody undershrub 3 ft. high, with flowers—" calyx green, corolla brown "—⅛ in. long in small axillary cymes.
   Fernando Po (Jan.) ! Exsicc.—*Barter* (no number). *Mann* 234.
2. **M. ? subpunctatum** *Hiern*—F.T.A. 3 : 111.
   Gold Coast : Cape Coast ! Exsicc.—Coll. ?

## 7. **MACROSPHYRA** Hook. f.—F.T.A. 3 : 105.

Branchlets pubescent ; leaves ovate-orbicular, shortly pointed, up to 12 cm. long, softly tomentose, especially when young ; petiole 1·5-2 cm. long ; stipules deciduous, dry and chaffy, ovate-lanceolate, about 1·5 cm. long ; flowers several to many in a terminal sessile cluster ; ovary tomentose ; calyx-lobes subulate-lanceolate, about 5 mm. long ; corolla very variable, the tube 2–4·5 cm. long, hirsute outside, lobes obovate ; anthers exserted ; style long-exserted, with a large subglobose stigma ; fruit subglobose, 4·5 cm. diam. .. .. .. .. .. 1. *longistyla*

Branchlets, etc., as above, but flowers 1–3 in each cluster and with a very short corolla-tube and much larger limb about 12 cm. diam. when spread out 2. *brachysiphon*

1. **M. longistyla** *Hook. f.*—F.T.A. 3 : 106 ; Chev. Bot. 318. A climbing shrub with wrinkled tomentose leaves and white tubular strongly scented flowers 1½–3 in. long in terminal head-like clusters.
   Fairly common from Senegal to N. and S. Nigeria, and extending to Cameroons, E. Sudan and Uganda. Exsicc.—*Brunner. Boivin. Whitfield. Kirk. Barter* 3374. *Mann* 821. *Irving* 166. *Rowland. Millson. Sc. Elliot* 5068. *Millen* 91 ; 208. *Elliott* 49. *Pobéguin* 221. *Baumann* 451. *Schlechter* 12320. (See Appendix).
2. **M. brachysiphon** *Wernham* in Journ. Bot. 1917 : 79. Habit of the preceding, but having " azalea-pink " flowers with a large corolla.
   S. Nigeria : Degema, Abua-Owere-were Road ! Benin, Ogba R. (Dec.) ! Exsicc.—*Talb.* 3764. *Farquhar* 45. *Maitland* 16.

## 8. **GARDENIA** Ellis[1]—F.T.A. 3 : 99.

*Flowers solitary or rarely paired :

Flowers sessile or subsessile on a very short stout stalk :

Calyx-lobes broadly spathulate-obovate, leafy, 1–1·5 cm. long, about 6 mm. broad ; corolla-tube slender, about 8 cm. long, glabrous, lobes oblong, 5 cm. long ; anther-tips exserted ; leaves obovate-elliptic, abruptly acuminate, about 10 cm. long and 5 cm. broad, glabrous ; fruit oblanceolate in outline, woody, about 7 cm. long 1. *nitida*

Calyx-lobes not as above :

Leaves pubescent on the lower surface or on the nerves below :

Calyx-lobes broadly ovate-lanceolate, 2·5–3 cm. long, 1·5–2 cm. broad ; corolla-tube 10–12 cm. long, shortly tomentose, lobes obovate, about 6–7 cm. long ; anthers 2·5 cm. long, exserted ; leaves obovate, abruptly acuminate, 10–14 cm. long, 5–7 cm. broad, pilose on the nerves below ; fruit ellipsoid, 7 cm. long 2. *Kalbreyeri*

Calyx-lobes linear-oblong or subulate, small ; flowering branchlets very short :

Calyx-lobes about 1 cm. long, linear-oblong ; corolla-tube 4–6 cm. long, slightly pubescent, lobes narrowly obovate, 3–5 cm. long ; leaves sessile, obovate, rounded at the apex, 6–12 cm. long, up to 6 cm. broad, shortly scabrid-pubescent below ; fruit narrowly ellipsoid, about 8 cm long .. .. 3. *triacantha*

Calyx-lobes about 3 mm. long, subulate ; corolla-tube 2–3 cm. long, shortly pubescent, lobes 2 cm. long ; leaves as above but much smaller on the flowering shoots, on others as much as 15 cm. long and 5 cm. broad ; fruits shortly ellipsoid, ribbed, 4 cm. long .. .. .. .. .. .. 4. *aqualla*

Leaves glabrous or hairy only in the axils of the nerves :

Young shoots and calyx outside densely tomentose ; calyx-tube truncate with filiform lobes, lobes 0·5–1·3 cm. long ; corolla-tube 4–7 cm. long, pubescent outside, lobes about 2–3 cm. long ; leaves subsessile, broadly obovate, rounded at the apex, up to 17 cm. long and 11 cm. broad, glabrous and venose below, often pinkish when dry ; fruits leathery, 5–8 cm. long .. 5. *erubescens*

Young shoots and calyx-tube at most puberulous or viscid :

Corolla-tube only slightly widened towards the top, up to about 1 cm. diam. at the throat :

Corolla 8–9 (rarely 7)-lobed ; tube about 5–10 cm. long, glabrous ; lobes 4 cm. long ; ovary 9-merous ; leaves obovate, rounded to broadly acuminate at the apex, up to 15 cm. long, and 7 cm. broad, with numerous parallel nerves ; fruit curved, about 10 cm. long and 2·5 cm. diam. .. 6. *Jovis-tonantis*

Corolla 5–6 (rarely 7)-lobed :

Corolla-tube up to about 6–9 cm. long, lobes obovate, 3 cm. long ; calyx-lobes short to almost nothing ; ovary 6-merous ; leaves leathery, oblanceolate to obovate, up to 12 cm. long, closely reticulate ; fruit oblong, 6 cm. long, with a fibrous pericarp .. .. .. .. .. .. 7. *ternifolia*

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[1] The genera *Gardenia* and *Randia* are much in need of revision and recasting on lines other than the placentation of the ovary.—J. H.

Corolla-tube 12–14 cm. long, lobes oblong, up to 8 cm. long; calyx-lobes subulate-lanceolate, about 5–8 mm. long; leaves membranous, elongate-oblong-obovate, acuminate, up to 30 cm. long and 10 cm. broad, very laxly reticulate; fruit elongate, 10 cm. long .. .. .. .. 8. *Vogelii*

Corolla-tube much widened towards the top, 3–4 cm. diam. at the throat, about 14 cm. long; anthers 4 cm. long; young shoots viscid; leaves subsessile, obovate, very shortly acuminate, 15–30 cm. long, 10–20 cm. broad, with numerous lateral nerves; fruits ellipsoid, 5 cm. long .. 9. *imperialis*

Flowers on fairly long and slender pedicels:

Corolla-tube about 1 cm. long, campanulate; calyx glandular within, lobes linear, 8–10 mm. long; young shoots and calyx viscid; leaves oblong-elliptic, rounded at each end, about 6 cm. long (rarely up to 10 cm.) and 4 cm. broad, with about 12 pairs of lateral nerves puberulous below; fruits broadly ellipsoid, 1 cm. long, with a very thin shell .. .. .. .. .. .. .. 10. *sokotensis*

Corolla-tube about 6 cm. long, gradually widened upwards; leaves elliptic, acuminate, 10–15 cm. long, 5–8 cm. broad, glabrous below except in the axils of the 5–6 pairs of lateral nerves .. .. .. .. .. .. .. 11. *Abbeokutae*

**Flowers in a terminal cluster or cyme:

Corolla abruptly expanded about 5 mm. above the base, about 4·5 cm. long; calyx subtruncate, free part very short, glabrous; flowers about 5 together; leaves obovate-elliptic, rounded at the apex, 6–8 cm. long, 3–4 cm. broad, glabrous, with about 4–5 pairs of lateral nerves, the midrib forked well below the apex 12. *Cunliffeae*

Corolla gradually and slightly narrowed from the base upwards, 4 cm. long; calyx shortly tubular, lobes ovate-triangular, ciliate; flowers numerous; leaves broadly oblong-elliptic, rounded at the base, 10–18 cm. long, 7–10 cm. broad, glabrous, with 5–6 pairs of lateral nerves; petiole 2·5–4 cm. long; stipules deciduous 13. *fernandensis*

1. **Gardenia nitida** *Hook.* Bot. Mag. t. 4343. *G. fragrantissima* Hutch. in Kew Bull. 1916 : 39, with fig. *G. Lane-Poolei* Hutch. ex Lane-Poole, name only. A shrub erect or sometimes more or less straggling with white fragrant tubular flowers 4–5 in. long sticky in bud, and spindle-shaped leathery fruits 2–3 in. long, ¾–1 in. broad.

Sierra Leone: Kambia (fr. Apr.)! Kessewe (Apr.)! Makump (fl. and fr. July)! Jigaya (fr. Sept.)! Gold Coast: Nsawam (Jan.)! Afram Plains (May)! S. Nigeria: ? locality! Exsicc.—*Brown* 132. *Sc. Elliot* 4410. *Lane-Poole* 127. *N. W. Thomas* 934; 2483. *Foster* 190. *Kitson* 1134.

2. **G. Kalbreyeri** *Hiern* in Journ. Bot. 1878 : 97. *Randia purpureo-maculata* C. H. Wright. *Gardenia Gossleriana* K. Schum. A shrub climbing or suberect with showy flowers yellow with purple markings, the corolla-tube 4–5 in. long, the limb 4–6 in. across when open.

S. Nigeria: Calabar (Jan., Feb.)! Calabar R.! Oban! Also in Cameroons. Exsicc.—*Holl.* 8. *Kalbreyer* 212. *Talb.* 1311; 1317.

3. **G. triacantha** *DC.* Prodr. 4 : 382; Stapf & Hutch. in Journ. Linn. Soc. 38 : 426. *G. Thunbergia* Hiern—F.T.A. 3 : 100, partly, not of Linn. f. *G. nigerica* A. Chev. Bot. 323, name only. A stiff shrub with tortuous branches of the savannah, with white fragrant flowers 2–2½ in. long and ribbed fruits.

French Sudan: Moriquénióba (Mar.)! Tiódiana (June)! Sansanding (fr. Sept.)! Senegal! Gambia: North bank (July)! Sierra Leone: ? localities! Gold Coast: N. Terr. Kuluissa to Tagalo (Feb.)! Exsicc.—*Roger*. *Ozanne* 7. *Smythe* 1. *N. W. Thomas*. *Kitson* 868. *Chev.* 447 bis; 993; 2025. (See Appendix).

4. **G. aqualla** *Stapf & Hutch.* in Journ. Linn. Soc. 38 : 427; Chev. Bot. 322. A shrub like the last with wrinkled leaves and smaller flowers 1–1½ in. long and ribbed barrel-shaped fruits.

French Sudan: Mossi (Aug.)! Gold Coast: N. Terr., several localities (Mar.–May)! N. Nigeria: Sokoto! Zaria (Feb.)! Gari Gwenchi (Apr.)! S. Nigeria: Yoruba country hills! Extends to Shari and E. Sudan. Exsicc.—*Barter* 1234. *Dalz.* 352. *Ryan* 16; 46. *Kitson* 670; 811.

5. **G. erubescens** *Stapf & Hutch.* in Journ. Linn. Soc. 38 : 428; Chev. Bot. 322. *G. triacantha* var. *parvilimbis* Williams. A shrub or small tree of the savannah, with pale bark rather silky on the twigs, often stunted and twisted in growth, and white fragrant flowers 2–3 in. long, fruit not ribbed.

French Sudan: Négala (Jan.)! Guienguénia (Feb.). Senegal! Gambia: Georgetown and vicinity (Jan.)! French Guinea: Mamou (Mar.)! Nounou Pampa (Dec.)! Sierra Leone: Scarcies, Wallia (Feb.)! Samu country, Tombia (Dec.)! Batkanu (Apr.)! Ivory Coast: confluence of Sassandra and Bafing! Gold Coast: N. Terr., Yendi (Apr.)! Yipala to Kulmassa (Feb.)! Dahomey: Atacora Mts., 1,350–1,700 ft. N. Nigeria: Kontagora (Jan.)! Katagum (Feb.)! Bauchi Plateau (Jan.)! Extends to E. Sudan. Exsicc.—*Heudelot* 181. *Sc. Elliot* 4370; 4574. *Dalz.* 161 (partly); 224; 8044; 8408. *Vigne* 1696. *Kitson* 857. *Rea* 1614. *Lely* P. 93. (See Appendix).

6. **G. Jovis-tonantis** *Hiern*—F.T.A. 3 : 101; Stapf. & Hutch. in Journ. Linn. Soc. 38 : 421; Chev. Bot. 323. Habit of the preceding with puberulous bark, flowers 1½–3 in. long, and ellipsoid or spindle-shaped sometimes curved rather woody fruit 3–4 in. long.

French Sudan: Gourma, Konkobiri to Diapaga! Ivory Coast: near Dotou! Gold Coast: Ejura! Afram Plains! British Togo: Kpedsu (fr. Jan.)! Extends to E. Sudan, Uganda, Angola and ? Portuguese E. Africa. Exsicc.—*Chipp* 737. *Howes* 1078. *Kitson* 1131. *Chev.* 35; 21778; 24358. (See Appendix).

7. **G. ternifolia** *Schum. & Thonn.* Beskr. Guin. Pl. 147; Stapf. & Hutch. in Journ. Linn. Soc. 38 : 425; Holl. 3 : 357; Chev. Bot. 323, partly. *G. Thunbergia* Hiern—F.T.A. 3 : 100, partly, not of Linn. f. A stiff savannah shrub 5–15 ft. high often of twisted habit, with glabrous branchlets and white fragrant flowers 3–4 in. long; fruits not ribbed.

Sierra Leone: Kaballa! Gold Coast: Kwahu (Jan.)! Ashanti, N. Prov. Sissu! Achimota (Feb.)! Afram Plains (fr. May)! N. Terr., Salaga! Wahabu to Funsi (Apr.)! Togo: Kpedsu (Jan.)! Kenre! Dahomey: Atacora Mts., 950–1,850 ft., Tanguóta. N. Nigeria: Nupe! Zungeru (Jan.)! Katagum! Kuka (Apr.)! Lake Chad (Jan.–Feb.)! Bauchi Plateau (Jan.)! S. Nigeria: Oloke Meji! Exsicc.—*E. Vogel* 92. *Baikie*. *Barter* 1205. *Elliott* 30. *Dalz.* 161; 162. *Chipp* 493; 630. *Howes* 1078. *Dodd* 401. *Lely* P. 70. *Talb.* 271. *Kersting* A. 408. (See Appendix).

8. **G. Vogelii** *Hook. f.* in Hook. Ic. Pl. t. 782–3.—F.T.A. 3 : 103; Holl. 3 : 358; Chev. Bot. 324. A glabrous shrub up to 15 ft. high with white tubular fragrant flowers 6 in. long and rather narrow spindle-shaped fruits 4 in. long and often curved.

Ivory Coast: Bouroukrou (Dec.–Jan.)! Cavally Basin, Tépo country, Taté (Aug.)! Gold Coast: Akyease (fl. and fr. June)! S. Nigeria: Lower Niger, Abo, etc. (fl. and fr. Aug.)! Oban! Also in Upper Welle region. Exsicc.—*T. Vogel* 58. *Barter* 156. *Fishlock* 79. (See Appendix).

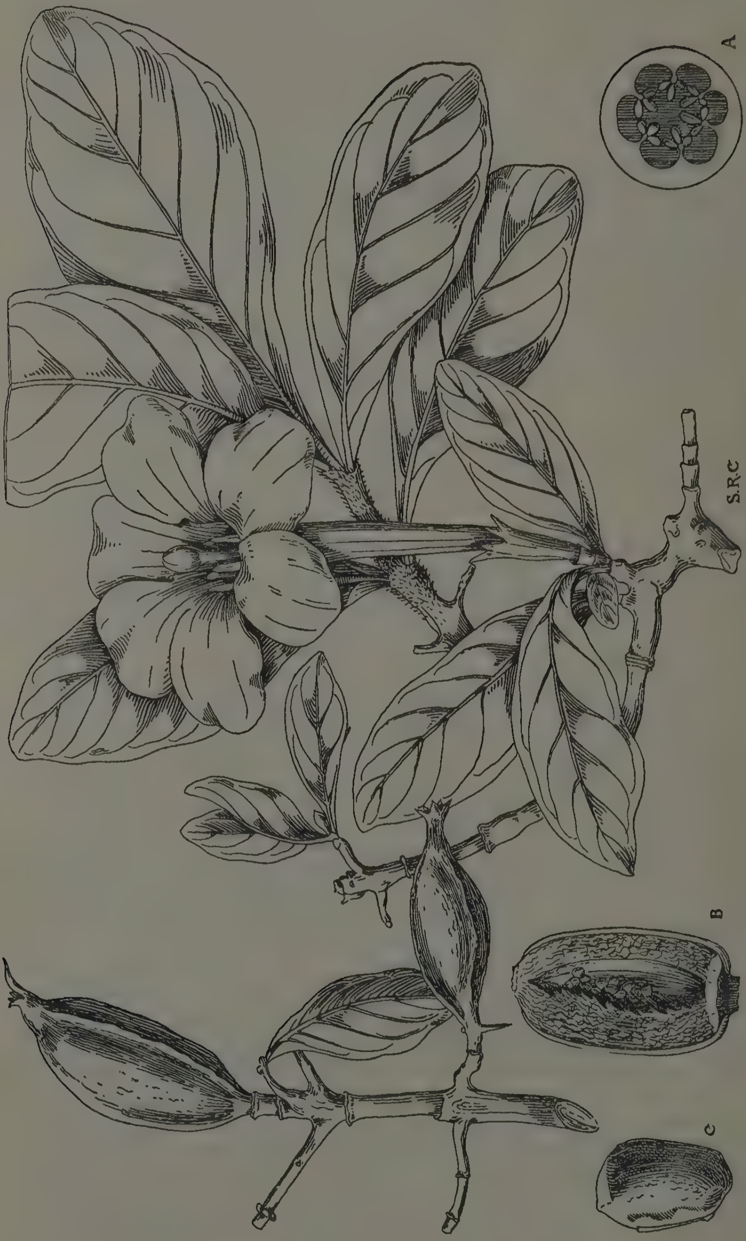

FIG. 199.—GARDENIA TERNIFOLIA *Schum.* & *Thonn.* (RUBIACEAE). A, cross-section of ovary. B, longitudinal section of fruit. C, seed.

9. **G. imperialis** *K. Schum.* in Engl. Bot. Jahrb. 23 : 442. *Randia physophylla* K. Schum. *Gardenia viscidissima* S. Moore ; Chev. Bot. 324. A tree up to 20 ft. high by swamps and streams, with stout branchlets and large shining leaves, viscid on the young parts ; the flowers are large, white 6–8 in. long, wide-mouthed,

French Sudan : Siguiri (May) ! Nono (Feb.) ! Senegal : Casamance ! French Guinea : Mamou (fr. Mar.) ! Kollangui ! Sierra Leone : Falaba (fr. Mar.) ! Jama to Yamadu (July) ! Kyema (Apr.) ! Samaia ! Ivory Coast : Dabou (fr. Feb.) ! Gold Coast : Axim ! N. Nigeria : Bauchi Plateau (Jan.) ! S. Nigeria : Eba ! Degema ! Oban ! Extends to Angola and Rhodesia ; also in Uganda and Tanganyika. Exsicc.—*Burton & Cameron.* *Sc. Elliot* 5141. *Lane-Poole* 106. *Aylmer* 91 ; 92. *Sankey* 167. *Dalz.* 8405. *Lely* P. 117. *Talb.* 278 ; 3616. *Chev.* 431 ; 887 ; 2120 ; 13501 ; 16210. (See Appendix).

10. **G. sokotensis** *Hutch.* in Kew Bull. 1912 : 99, and in Hook. Ic. Pl. t. 2991. *G. mossica* A. Chev. *Randia lucida* A. Chev. *R. mossica* A. Chev. A shrub of dry rocky hills, the younger parts sticky, with prominently-nerved leaves and white flowers about ¾ in. long.

French Sudan : Kankaw-Kouroussa ! Gourma ! French Sudan : Mossi, from Yako to Gourpé (Aug.) ! N. Nigeria : Sokoto (July) ! Exsicc.—*Dalz.* 402. *Chev.* 829 ; 965 ; 2118 ; 15640 ; 24413 ; 24733. (See Appendix).

11. **G. Abbeokutae** *Hiern*—F.T.A. 3 : 104. *G. Hiernii* Sc. Elliot. A scrambling glabrous shrub with shining leaves and cream-white flowers 2–3 in. long.

Sierra Leone : Bagroo R. (Apr.) ! Limba, near Kafogo (Apr.) ! Liberia : Dukwia R. (Feb., Apr.) ! Gold Coast : Cape Coast (May) ! Assabraka to Nteso (Apr.) ! S. Nigeria : Abeokuta ! Oban ! Between Victoria and Bimbia. Also in French Cameroons. Exsicc.—*Irving* 32. *Mann* 840. *Sc. Elliot* 5516. *Dalz.* 51. *Kitson* 1044. *G. P. Cooper* 290 ; 388.

12. **G. Cunliffeae** *Wernham* in Journ. Bot. 1914 : 5. A glabrous climbing shrub with rough-splitting bark, and fragrant white flowers 1½ in. long which, like the leaves, turn black in drying.

S. Nigeria : Atigere (May) ! Eket, Ubium R. ! Exsicc.—*Talb.* 3149. *Millen* 144.

13. **G. fernandensis** *Hiern*—F.T.A. 3 : 105. *G. ramentacea* K. Schum. *Randia chloroleuca* K. Schum. *R. psychotrioides* K. Schum. A scrambling shrub, nearly glabrous, with slender white fragrant flowers 1–1½ in. long numerous in corymbose cymes.

Sierra Leone : Talla Hills, common (fl. and fr. Feb.) ! Bafodeya (fr. Apr.) ! Freetown (Jan.) ! Bumban (Feb.) ! Gold Coast : Kumasi (Apr.) ! N. Nigeria : Loko (Nov.) ! S. Nigeria : Eket ! Oban ! Fernando Po (Dec.) ! Also in Cameroons and Portuguese Congo. Exsicc.—*Mann* 22. *Sc. Elliot* 4914 ; 4926 ; 5184 ; 5574. *Dalz.* 44. *Titchford* 348. *Glanville* 163. *Talb.* 3030.

## 9. **SCHUMANNIOPHYTON** Harms in Engl. Pflanzenfam. 1 : 313 (1897) ; Good in Journ. Bot. 1926 : 169.

Leaves very large, elongate-obovate, cuneate at the base, 60 cm. or more long, about 30 cm. broad, minutely pubescent on the nerves below, with about 30 pairs of lateral nerves spreading at an angle of about 45° ; tertiary nerves lax and curved ; midrib prominent on both surfaces ; flowers sessile in a cluster ; ovary and calyx tomentose, together about 1 cm. long ; calyx-teeth very shortly subulate ; corolla-tube 6–7 cm. long, densely tomentellous, lobes 7–10, narrowly lanceolate, 2 cm. long *magnificum*

S. **magnificum** *Harms*, l.c. *Randia immanifolia* Wernham. *Tetrastigma magnificum* K. Schum. A shrub or small tree, 12–16 ft. high, with very large leaves up to about 3 ft. in length, and long-tubular whitish or yellow flowers 3–4 in. long in a dense cluster ; in forest undergrowth.

S. Nigeria : Degema ! Oban ! Also in Cameroons. Exsicc.—*Talb.* 189 ; 3681.

## 10. **TARENNA**[1] Gaertn.—F.T.A. 3 : 88.

Leaves pubescent on the midrib and lateral nerves below :

Calyx-lobes more or less ovate-triangular or transversely oblong, nearly as broad as long :

Calyx-lobes transversely oblong, glabrous ; leaves oblong-oblanceolate, long-acuminate, about 15 cm. long and 3–4·5 cm. broad ; lateral nerves 7–8 pairs ; cymes few-flowered ; pedicels 3 mm. long ; corolla-lobes 6 mm. long .. 1. *Vignei*

Calyx-lobes triangular, pubescent ; leaves obovate-elliptic, abruptly acuminate, about 10 cm. long and 5 cm. broad ; lateral nerves about 6 pairs ; cymes rather dense-flowered ; pedicels short, pubescent ; corolla-lobes 6 mm. long 2. *conferta*

Calyx-lobes linear-oblong or subulate, much longer than broad :

Corolla-tube glabrous, 6 mm. long ; leaves narrowly obovate, abruptly acuminate, 8–10 cm. long, 2–4 cm. broad, minutely pubescent below ; calyx-lobes 2·5 mm. long, oblong .. .. .. .. .. .. .. .. 3. *Thomasii*

Corolla-tube pubescent, 6 mm. long ; leaves obovate-elliptic, broadly acuminate, 8–12 cm. long, 3–6 cm. long ; lateral nerves 5 pairs ; calyx densely pubescent 4. *eketensis*

Leaves glabrous below except in the axils of the nerves :

Corolla-tube 2–3 cm. long ; calyx-lobes very short and much broader than long, the tube appearing to be truncate ; cymes few-flowered, subsessile ; leaves oblong-oblanceolate, rather abruptly acuminate, very acute at the base, about 15 cm. long and up to 8 cm. broad ; lateral nerves 7–8 pairs .. .. 5. *grandiflora*

Corolla-tube up to 1·5 cm. long :

Calyx-lobes very broadly oblong, rounded at the apex, subimbricate :

Calyx-lobes pubescent outside ; corolla-tube 8 mm. long ; leaves oblong, abruptly acuminate, rounded at the base, 12–15 cm. long ; lateral nerves 4–5 pairs ; petiole 1 cm. long .. .. .. .. .. .. .. .. 6. *baconioides*

Calyx-lobes glabrous outside ; corolla-tube 3–4 mm. long ; leaves oblong-elliptic, broadly acuminate, shortly cuneate at the base, 7–15 cm. long ; lateral nerves 6 pairs ; petiole 1 cm. long .. .. .. .. .. .. 7. *patula*

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[1] The genera **Tarenna** and **Pavetta** are not very naturally separated by the number of ovules, and they should probably be united or recast on different lines.

Calyx-lobes more or less triangular, acute :

Calyx glabrous outside, lobes very small ; cymes very few-flowered ; corolla-tube 1·5 cm. long, lobes 1 cm. long ; leaves oblong to narrowly elliptic, shortly acuminate, subacute at the base, 6–9 cm. long, up to 3·5 cm. broad ; lateral nerves about 5 pairs .. .. .. .. .. .. .. 8. *lagosensis*

Calyx pubescent outside, lobes small ; cymes often many-flowered ; corolla-tube 1–0·5 cm. long, lobes 6 mm. long ; leaves variable, oblong-oblanceolate to obovate, broadly acuminate, very acute at the base, up to 15 cm. long and 5 cm. broad, with 8–10 pairs of lateral nerves.. .. .. .. .. 9. *nitidula*

1. **Tarenna Vignei** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with nearly glabrous striate branchlets and greenish-white flowers ¼ in. long in rather lax terminal cymes.
   Gold Coast : Amentia, in forest (Nov.) ! Exsicc.—*Vigne* 1461.
2. **T. conferta** *Hiern*—F.T.A. 3 : 90 ; Chev. Bot. 319. *T. flexilis* A. Chev. A shrub, 12–15 ft. high, with puberulous branchlets and cream-white flowers ½ in. long in rather dense terminal cymes, turning nearly black in drying.
   French Guinea : Kankan (Mar.) ! Ivory Coast : Agniéby valley ! S. Nigeria : Lagos, Ikoyi, etc. (Feb.–Apr., Oct.) ! Akassa (fl. and fr. Aug.) ! Brass ! Fernando Po, by the river (Jan.) ! Exsicc.—*T. Vogel* 23. *Barter* 28 ; 2131. *Dawodu* 358. *Dalz.* 1019 ; 1054 ; 1202. *Chev.* 17177. (See Appendix).
3. **T. Thomasii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub a few feet high, with shortly rusty-pubescent branchlets, and white flowers ⅓ in. long with grey-pubescent calyx, in terminal branched cymes.
   French Guinea : Farana (Mar.) ! Sierra Leone : Laminaiya (Apr.) ! Limba, Bafodeya (Apr.) ! Exsicc.—*Sc. Elliot* 5344 ; 5554. *N. W. Thomas* 126.
4. **T. eketensis** *Wernham* in Journ. Bot. 1914 : 4. *T. degemensis* Wernham. *Rutidea degemensis* Wernham. *R. Talbotiorum* Wernham. A tree up to 30 ft. or a shrub sometimes half-straggling, with obscurely 4-angular branchlets pubescent when young, and flowers (? white) ⅓–½ in. long, the inflorescence light golden silky-pubescent.
   Gold Coast : Western Prov. Bou (Nov.) ! S. Nigeria : Eket ! Degema ! Oban ! Exsicc.—*Talb.* 3024 ; 3827 ; 3828. *Vigne* 1411.
5. **T. grandiflora** *Hiern*—F.T.A. 3 : 91. A glabrous shrub or small tree 10–20 ft. high, with pale shining leaves and tubular flowers 1½ in. long, green outside, white inside, in rather lax terminal cymes.
   S. Nigeria : Eket ! Oban ! Fernando Po, in woods (June, Dec.) ! Exsicc.—*T. Vogel* 262. *Barter* (no number). *Mann* 25. *Talb.* 3366.
6. **T. baconioides** *Wernham* in Cat. Talb. Nig. Pl. 44. A shrub glabrous except on the inflorescence, with white flowers ⅓–⅜ in. long crowded in terminal 3-chotomous cymes.
   S. Nigeria : Oban ! Exsicc.—*Talb.* 1595.
7. **T. patula** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined.
   S. Nigeria : Eket ! *Talb.* 3257.
8. **T. lagosensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A nearly glabrous shrub erect or straggling, turning blackish in drying, with narrow-tubular white flowers 1 in. long in slender cymes.
   S. Nigeria : Lagos, Ikoyi ! Exsicc.—*Dalz.* 1043.
9. **T. nitidula** *Hiern*—F.T.A. 3 : 90 ; Chev. Bot. 319. *Webera gracilis* Stapf. *Chomelia gracilis* K. Krause. *Tarenna gracilis* A. Chev. Bot. 319. A shrub or small tree glabrous except the inflorescence, turning rather dark in drying, with white flowers ⅓–½ in. long in branched terminal cymes.
   French Guinea : between the Kaba and the Upper Mamou (May) ! valley of the Santa (Mar.) ! valley of the Kaba (May) ! Sierra Leone : common ! Liberia : Dukwia R. (Feb.) ! Ivory Coast : Makouguié (Jan.). Exsicc.—*T. Vogel* 147. *Whitfield.* *Barter* (no number). *H. H. Johnston* 4. *Sc. Elliot* 4700 ; 5473 ; 5618 ; 5769. *Smythe* 48 ; 131. *G. P. Cooper* 206.

## 11. **DOROTHEA** Wernham in Cat. Talb. Nig. Pl. 46, t. 7 (1913).

Calyx undulately lobulate or toothed ; branchlets glabrous ; leaves elliptic or obovate-elliptic, acutely acuminate, acute at the base, 10–16 cm. long, 4–8 cm. broad, glabrous, with about 5 pairs of lateral nerves ; cymes terminal, 2–3-flowered ; flowers subsessile ; corolla-tube 3 cm. long, villous in the middle part inside ; lobes 2–2·5 cm. long ; anthers 2 cm. long ; style bent through the slit of the corolla-tube 1. *Talbotii*

Calyx divided into long subulate teeth about 5 mm. long ; branchlets pubescent ; leaves elliptic to narrowly obovate, acutely acuminate, 6–10 cm. long, 2–4 cm. broad, very slightly pubescent on the nerves below ; cymes 3–4-flowered ; pedicels short, bracteate, densely pubescent ; corolla as above but tube 1·5 cm. long ; style sharply recurved .. .. .. .. .. .. .. .. 2. *divergens*

1. **D. Talbotii** *Wernham* l.c. A tree with glabrous branchlets and whitish tubular flowers 2 in. or more long, silky-pubescent outside, curved when in bud.
   S. Nigeria : Oban ! Exsicc.—*Talb.* 1546.
2. **D. divergens** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *D. minor* Wernham ex A. Chev. Bot. 324, name only. A tree 25 ft. high with flowers like the last about 1½ in. long.
   French Guinea : Kaba valley (May) ! Farana (Apr.) ! Sierra Leone : Hangha (Apr.) ! Exsicc.—*Lane-Poole* 219. *Farmar* 317. *Chev.* 13180 ; 13198.

## 12. **RANDIA**[1] Houst.—F.T.A. 3 : 93.

Branchlets armed with sharp subaxillary spines about 1·5 cm. long, pubescent ; leaves obovate, cuneate at the base, rounded at the apex, 3–7 cm. long, 2–3 cm. broad, very shortly pubescent on both sides, with 3–4 pairs of lateral nerves ; stipules broad, apiculate, soon falling off ; flowers solitary, small ; pedicels 0·5–1 cm. long, glabrous, calyx about 7 mm. long, shortly toothed, glabrous ; corolla about twice as long as the calyx, villous .. .. .. .. .. .. .. .. 1. *nilotica*

Branchlets not armed with spines :

*Flowers solitary, usually very large with usually long slender corolla-tube and expanded limb :

Stipules chaffy, persistent, crowded at the base of the leaves and flower, lanceolate, about 1·5 cm. long and 5 mm. broad, slightly scurfy; leaves clustered at the ends of the shoots, very thin, turning black or dark green when dry, narrowly obovate-elliptic, acuminate, acute at the base, about 15 cm. long and 4 cm. broad, glabrous except the midrib below; calyx-lobes linear, about 1 cm. long; corolla very slender, expanded at the top about 25 cm. long, glabrous outside; fruit ellipsoid-globose, 3–4 cm. diam. .. .. .. .. .. .. .. 2. *macrantha*

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[1] See footnote under *Gardenia*, p. 72.

Stipules not chaffy, often soon deciduous:

†Calyx truncate, with minute or very short teeth or shortly lobed, never spathaceous:

Corolla-tube glabrous outside or very minutely appressed-setulose with ascending hairs, not ribbed:

Calyx-tube about 5 mm. long, shorter or about as long as the ovary; leaves obovate-elliptic, abruptly acuminate, acute at the base, 18–25 cm. long, 6–8 cm. broad, glabrous, pitted in the axils of the nerves below; lateral nerves 10–15 pairs; corolla about 20 cm. long, slender, abruptly expanded towards the top 3. *coriacea*

Calyx-tube about 1 cm. long, from as long to longer than the ovary; leaves obovate-elliptic, gradually acuminate, cuneate at the base, 9–11 cm. long, 3–4 cm. broad, with minute pits in the axils of the 4–5 pairs of lateral nerves; corolla 20–23 cm. long, slender, rather gradually expanded towards the top, finely setulose outside; fruit globose, about 4·5 cm. diam. 4. *maculata*

Corolla-tube densely tomentellous with often descending hairs, often ribbed:

Corolla-tube over 20 cm. long:

Calyx-tube 1·5 cm. long, narrow, prominently ribbed; leaves petiolate, narrowly obovate-oblanceolate, long-acuminate, about 16 cm. long and 7 cm. broad, with about 9 pairs of lateral nerves; corolla about 26 cm. long, gradually expanded towards the top .. .. .. .. .. 5. *Talbotii*

Calyx-tube 1 cm. long, broad, not ribbed; leaves subsessile, obovate, broadly cuneate at the base, hardly acuminate, 26 cm. long, 12–14 cm. broad, often hairy in the axils of the 7–9 pairs of lateral nerves; corolla about 26 cm. long, gradually expanded in the upper third; fruit ellipsoid about 10 cm. long 6. *Lane-Poolei*

Corolla-tube under 5 cm. long, finely tomentellous:

Calyx-teeth triangular, about 1 mm. long; corolla-tube about 3 cm. long, rather stout; leaves obovate, acuminate, abruptly acute at the base, 6–9 cm. long, up to 6 cm. broad, glabrous .. .. .. .. .. 7. *Thomasii*

Calyx-teeth subulate, about 3 mm. long; corolla-tube 3–5 cm. long, slender, leaves obovate or elliptic, long-acuminate, subauriculate at the base, 12–15 cm. long, up to 6·5 cm. broad, slightly pubescent on the nerves below 8. *leptactinioides*

††Calyx with long or fairly long linear or filiform lobes, sometimes spathaceous; corolla pubescent or tomentose:

Calyx spathaceous, *i.e.*, splitting about half-way down one side of the tube:

Calyx 8–9 cm. long; branchlets and nerves below thinly pilose; leaves elliptic, acuminate, about 15 cm. long and 5–8 cm. broad; corolla silky-villous, about 15 cm. long .. .. .. .. .. .. .. .. 9. *hispida*

Calyx 2·5 cm. long; branchlets and nerves below nearly glabrous; leaves oblanceolate or narrowly elliptic, acutely acuminate, about 12 cm. long and 3–5 cm. broad; corolla rather short .. .. .. .. .. 10 *stenophylla*

Calyx not spathaceous:

Calyx with a very short tube; lobes linear-filiform, about 4 cm. long; corolla about 20 cm. long, tube ribbed and thinly pilose; leaves elliptic or obovate acutely acuminate, about 12 cm. long and 4–6 cm. broad, rather densely pilose 11. *octomera*

Calyx with a fairly long tube (about 1 cm. long), velvety-tomentellous, lobes linear, about 4–5 cm. long; corolla-tube very variable in length, from 4–17 cm. long, broadly expanded in the upper third; stamens 4 cm. long; stigma large and club-shaped; fruit broadly ovoid .. .. .. 12. *malleifera*

†††Calyx deeply lobed with broad oblong silky lobes, over 1 cm. long; corolla about 4·5 cm. long, constricted at the base for about 7 mm. long, widened in the upper part; leaves obovate-elliptic, slightly pointed, about 12 cm. long and 6 cm. broad, glabrous .. .. .. .. .. .. .. 13. *amaralioides*

**Flowers in clusters or cymes:

Calyx truncate or with short teeth:

Corolla glabrous outside:

Leaves subcordate-auriculate at the base, elliptic-obovate, acuminate, 15–25 cm. long, up to 9 cm. broad, glabrous or nearly so; flowers shortly stalked; calyx 6–7 mm. long, glabrous, corolla acutely acuminate in bud, 1 cm. long, glabrous; anthers subincluded; fruits narrowly ovoid, about 5 cm. long, beaked 14. *acuminata*

Leaves obtuse to acute at the base :

Calyx puberulous, tube 6–7 mm. long, leaves oblong-elliptic, acuminate, 10–15 cm. long, 4–6 cm. broad, glabrous ; anthers exserted ; fruits small, globose, about 1 cm. diam., crowned by the persistent base of the calyx 15. *genipaeflora*

Calyx glabrous ; tube 3 mm. long ; leaves elliptic or lanceolate-elliptic, gradually acute, 12–14 cm. long, 3–6 cm. broad, glabrous, with obscure nerves, corolla 8 mm. long .. .. .. .. .. .. .. .. 16. *rubens*

Corolla densely silky outside, widened from just above the base, 2–2·5 cm. long :

Calyx-tube cupular, about 5 mm. long, tomentellous ; leaves obovate, long-cuneate at the base, up to 30 cm. long and 10 cm. broad, minutely pubescent below, thin .. .. .. .. .. .. .. .. 17. *cladantha*

Calyx nearly 1 cm. long, dentate, silky outside ; leaves broadly elliptic, broadly acuminate, 10–16 cm. long, 5–8 cm. broad, pubescent only on the midrib below ; corolla 3·5 cm. long, densely silky outside ; fruit ellipsoid, ribbed, 3–4 cm. long, crowned by the calyx .. .. .. .. .. 18. *amaraliocarpa*

Calyx 1·5 cm. long, campanulate, constricted at the base, tomentose ; leaves very broadly elliptic, rounded at the base, 12–18 cm. long, 7–12 cm. broad, softly tomentellous below ; corolla 3·5 cm. long, tomentose ; fruit ribbed ; pedicels 1·5 cm. long .. .. .. .. .. .. .. 19. *hapalophylla*

Calyx large and deeply lobed, lobes spathulate-oblanceolate, about 1·5 cm. long ; corolla slightly widened towards the top, about 4 cm. long ; leaves elongate-obovate acuminate, about 30 cm. long and 8 cm. broad, thin and glabrous, finely reticulate .. .. .. .. .. .. .. .. 20. *sulphurea*

1. **Randia nilotica** *Stapf* in Journ. Linn. Soc. 37 : 519 ; Holl. 3 : 357. *R. dumetorum* Hiern, F.T.A. 3 : 94, partly, not of Lam. A stiff spiny shrub, often many-stemmed, with white flowers ½ in. or more long.
N. Nigeria : Sokoto, Isa, etc. (Apr., May) ! Katagum ! Extends to E. Sudan, Abyssinia and E. Africa. Exsicc.—*Dalz.* 298. *Ryan* 39 ; 68. *Lely* 824. (See Appendix).

2. **R. macrantha** *DC.*—F.T.A. 3 : 97 ; Holl. 3 : 355 ; Chev. Bot. 320. A shrub, erect, scrambling or more or less climbing, nearly glabrous, with fragrant flowers 6–10 in. long, white with red spots, the corolla-tube often red-brown externally ; fruits subglobose, 1–1½ in. in diameter, faintly ribbed.
Sierra Leone : various localities ! Ivory Coast and Gold Coast : common, Togo : Amedzofe (Mar.) ! S. Nigeria : Epe ! Ikirum ! Lagos Colony ! Oban ! Olokemeji. Cameroons Mt., 2,000–3,000 ft. (Dec.) ! Extends to Angola, E. Sudan and Uganda. Exsicc.—*Barter* 3291. *Mann* 2164. *Sc. Elliot* 4137 ; 5511. *Millson. Rowland. Farmar* 439. *Johnson* 694. *Lane-Poole* 103 ; 283.

3. **R. coriacea** *K. Schum.*, MS. A small tree with long trumpet-shaped flowers like the last.
S. Nigeria : between Degema and Isoba (Oct.) ! Oban ! Also in Portuguese Congo. Exsicc.—*King-Church* 48. *Talb.* 1267. (See Appendix).

4. **R. maculata** *DC.*—F.T.A. 3 : 96 ; Stapf 611 ; Holl. 3 : 356 ; Chev. Bot. 321. A shrub often much branched in forest undergrowth, nearly glabrous, with shining foliage and solitary fragrant flowers 6–10 in. long, white or rose-red with purple blotching.
Gambia ! French Guinea : Danané ! Between the Santa and Timbo (Mar.). Sierra Leone : Kambia (Dec., Jan.) ! Serabu (Jan.) ! Talla Hills, Duunia (Feb.) ! Port Lokko (Dec.) ! Zimmi (Nov.) ! Liberia : Kakatown ! Ivory Coast and Gold Coast forests, fairly common ! N. Nigeria : Nupe ! S. Nigeria : Lagos Colony ! Oshogco ! Abeokuta (Jan.) ! Ogwashi (Nov.) ! Degema ! Oban ! Fernando Po (Jan.) ! Extends to Angola, Upper Belgian Congo and Uganda. Exsicc.—*Boteler. Barter* (no number). *Irving. Mann* 178. *Sc. Elliot* 4392 ; 4821. *Millson. Rowland. Johnson* 837. *Punch* 79. *Talb.* 3678. (See Appendix).

5. **R. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 45. A small tree with subcoriaceous glabrous leaves and usually solitary long-tubular flowers 8–10 in. long, brown-pubescent on the outside.
S. Nigeria : Oban ! Exsicc.—*Talb.* 217.

6. **R. Lane-Poolei** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with rather large broad leaves, long-tubular red flowers 9–10 in. long, and ribbed fruit 3–4 in. long.
Sierra Leone : Quia (fl. and fr. July) ! Bumbuna (Oct.) ! Liberia ! Exsicc.—*Lane-Poole* 309. *N. W. Thomas* 3793. *Johnston.*

7. **R. Thomasii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with shining glabrous leaves and branchlets, flowers (immature) 2 in. long and subglobose fruits 1¾ in. in diameter.
Sierra Leone : Yetaya (Sept.) ! Matotoka (fr. July) ! Bumbuna ! S. Nigeria : near Lagos ! Idumuye (Jan.) ! Ala ! Ibuzo ! Exsicc.—*Rowland. N. W. Thomas* (Sierra Leone) 1371 ; 2311 ; 2332 ; 3466 ; 3734 ; 3878, and (Nigeria) 1959 ; 2005 ; 2176.

8. **R. leptactinioides** *K. Schum.*, MS. A shrub, apparently more or less scrambling, with white flowers about 2 in. long silvery-silky on the outside.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.* 285.

9. **R. hispida** *K. Schum.* in Engl. Bot. Jahrb. 33 : 437. *R. Pynaertii* De Wild. A shrub 6–10 ft. high, the young parts, leaf-nerves below, etc., covered with spreading hairs, with white tubular flowers 4–6 in. long densely pale-silky outside.
Liberia : Gbanga ! Ivory Coast : between Danané and Mt. Kouan (Apr.) ! Gold Coast : Axim district, Tukobo (Nov.) ! Ashanti, Nyaso (Dec.) ! S. Nigeria : Aguku ! Awka ! Degema (Sept., Oct.) ! Eket ! Oban ! Extends to Congo. Exsicc.—*Holl.* 156. *Macgregor* 318 ; 367. *N. W. Thomas* 77. *King-Church* 45. *Vigne* 1438 ; 1481. *Talb.* 201 ; 2026 ; 3137 ; 3638. *Linder* 785. *Chev.* 21261. (See Appendix).

10. **R. stenophylla** *K. Krause* in Engl. Bot. Jahrb. 43 : 140. Shrub or small tree 15 ft. high, with white purple-mottled tubular flowers about 3 in. long.
Sierra Leone : Kukuna, Scarcies R. (fl. and fr. Jan.) ! Gold Coast : Akwapim Hills (Jan.) ! N. Agogo, near Ejan (Jan.) ! Togo : Agaua, gallery forest (fr. Jan.) ! S. Nigeria : Oloke Meji ! Idumuye (Jan.) ! Exsicc.—*Sc. Elliot* 4673. *Johnson* 555. *Vigne* 1785. *Foster* 131. *N. W. Thomas* 2181. *Kersting* A. 285. (See Appendix).

11. **R. octomera** *Benth. & Hook. f.*—F.T.A. 3 : 98. *R. Galtonii* Wernham. *R. Cunliffeae* Wernham. *Gardenia octomera* Hook. Bot. Mag. t. 5410. A rather harshly-hirsute shrub with solitary flowers 6–7 in. long, the corolla-tube striate and beset with short spreading hairs.
S. Nigeria : Degema ! Eket ! Calabar ! Fernando Po ! Extends to Congo and Angola. Exsicc.—*Mann* (no number). *Thomson. Goldie. Talb.* 3076 ; 3219 ; 3385.

12. **R. malleifera** *Benth. & Hook. f.*—F.T.A. 3 : 98 ; Stapf 611 ; Holl. 3 : 356 ; Chev. Bot. 321. A shrub or small tree of the forest, with large fragrant whitish flowers brownish velvety outside, pendulous, the corolla-tube from less than 2 in. up to 6 in. or more long sometimes curved.
French Sudan : Medinani. Senegal : Casamance, etc. ! French Guinea : Konanké country, between Fassaikoidou and Kesseridou (Feb.) ! Diaguissa Plateau 4,000–4,400 ft. ; between the Santa and Timbo ; between the Kaba and Upper Mamu. Sierra Leone to S. Nigeria : common in places. Extends to Gabon.

E. Sudan. Uganda and E. Africa. Exsicc.—*Heudelot* 809. *Barter* 3367. *Mann* 913. *Whitfield.* *Miss Turner.* *Sc. Elliot* 3953; 4706; 4952; 5025. *Cummins.* *Johnson* 252. *Holl.* 252. *Whyte.* *Reynolds* 4. *Foster* 76. *Talb.* 3697. *Linder* 482. *Chev.* 20832. (See Appendix).

13. **R. amaralioides** *K. Schum.*, MS. A shrub or small tree with solitary axillary flowers 1½ in. long having a wide corolla-tube pale brownish-tomentose outside.

Gold Coast: Obuasi (fr. Jan.)! S. Nigeria: Lagos Colony (Aug.)! Oban! Exsicc.—*Soward* 650. *Rowland.* *Talb.*

14. **R. acuminata** *Benth.*—F.T.A. 3 : 95; Stapf 611; Chev. Bot. 320. A glabrous shrub or small tree with papery leaves and usually red flowers scarcely 1 in. long in small axillary cymes.

Common from Sierra Leone to S. Nigeria and Fernando Po! Extends to Congo and Upper Welle. Exsicc.—*T. Vogel* 40. *Barter* 17. *Mann* 211. *Moloney.* *Sc. Elliot* 4203; 4704. *Johnson* 954. *Whyte.* *Millen* 164. *Talb.* 1328. *G. P. Cooper* 252. *Staudt* 506. (See Appendix).

15. **R. genipaeflora** *DC.*—F.T.A. 3 : 95; Holl. 3 : 335. *R. rhacodosepala* K. Schum. *R. sassandrae* A. Chev. A shrub or small tree with the habit of a coffee tree, nearly glabrous except on the inflorescence, with whitish flowers 1 in. long or less in axillary cymes, and globose fruit ⅓ in. in diameter.

Senegal! Sierra Leone: various localities! Liberia: Dukwia R. (Apr.)! Ivory Coast: Abidjean, Dabou! Gold Coast: Offin R., Nfaense (Feb.)! Obuasi! S. Nigeria: Lagos Colony (Aug.)! Degema! Oban! Johann-Albrechtshöhe! Fernando Po! Also in French Cameroons. Exsicc.—*Heudelot* 780. *T. Vogel* 90. *Barter* (no number). *Kirk.* *Mann* 228; 804. *Rowland.* *Sc. Elliot* 4358; 5549; 5612. *Chipp* 112. *G. P. Cooper* 403. *Talb.* 3728. *Chev.* 15170; 16382; 16792; 16822; 17949; 22371. *Staud* 615. (See Appendix).

16. **R. rubens** *Hiern*—F.T.A. 3 : 95. A glabrous climbing shrub with rather coriaceous leaves and white or reddish-tinged flowers ½ in. long, in short axillary cymes.

S. Nigeria: Calabar (Mar.)! Also in Cameroons. Exsicc.—*Thomson.*

17. **R. cladantha** *K. Schum.* in Engl. Bot. Jahrb. 28 : 62. A tree up to 40 ft. or more high, the young parts brownish-silky, with large leaves and stipules, and fragrant, silky, funnel-shaped flowers about 1 in. or less long, white or pinkish, yellowish inside, in clusters below the season's leaves.

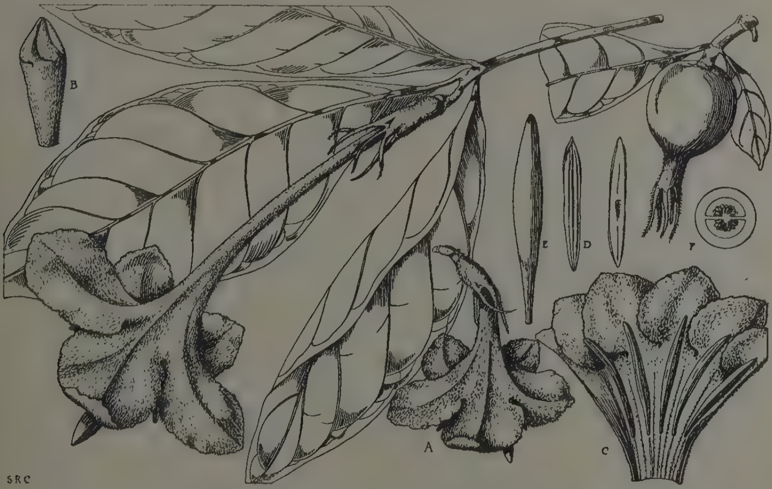

FIG. 200.—RANDIA MALLEIFERA *Benth. & Hook. f.* (RUBIACEAE).

A, a short-tubed flower. B, corolla-bud. C, upper part of corolla laid open. D, anthers. E, stigma. F, cross-section of ovary.

S. Nigeria: Western Province, ? locality! Agege! Oluwa. Oban! Also in Cameroons and Portuguese Congo. Exsicc.—*Thompson* 1. *Foster* 223. *Kennedy* 163.

18. **R. amaraliocarpa** *Wernham* in Journ. Bot. 1917 : 8.

S. Nigeria: Oron to Eket, on farm clearings! Exsicc.—*Talb.* 3021.

19. **R. hapalophylla** *Wernham* l.c. 9. *R. streptocaulon* Wernham Cat. Talb. Nig. Pl. 131, not of K. Schum. A climbing shrub, with wide-tubular velvety flowers creamy-white with red spots in the tube.

S. Nigeria: Oban! Also in Cameroons. Exsicc.—*Talb.* 211A.

20. **R. sulphurea** *K. Schum.* in Engl. Bot. Jahrb. 23 : 441. *R. exserta* K. Schum. A glabrous shrub of forest undergrowth, with sulphur-yellow or yellowish-white flowers, few, subumbellate, about 1½ in. long, the corolla-tube not much exceeding the calyx; fruit ¾ in. in diameter, about 6-seeded.

S. Nigeria: Degema! Oban! Rio del Rey! Victoria (July)! Tiko (Feb.)! Johann Albrechtshöhe! Mokundange (Mar.). Fernando Po! Also in French Cameroons. Exsicc.—*Mann* 288. *Talb.* 1544, and without number. *Johnston.* *Dunlap* 254. *Staudt* 601; 34; 1296. *Preuss* 1386.

## 13. **OXYANTHUS** DC.—F.T.A. 3 : 106.

Calyx truncate, with very minute widely separated teeth:
  Corolla less than 5 cm. long:
    Leaves acute and subequal-sided at the base:
      Lateral nerves 4–5 pairs; corolla-tube about 3 cm. long; leaves oblong or oblong-elliptic, abruptly acuminate, abruptly acute at the base, 12–17 cm. long, up to 7 cm. broad; flowers in short corymbose cymes; pedicels slender, 8 mm. long 1. *laxiflorus*

Lateral nerves about 7 pairs; corolla-tube 4–5 cm. long; leaves as above but gradually narrowed to the base .. .. .. .. .. .. 2. *gracilis*

Leaves rounded and unequal-sided at the base, oblong, broadly acuminate, 15–25 cm. long, 6–9 cm. broad, with about 10 pairs of lateral nerves; flowers subpaniculate; corolla-tube 1 cm. long, lobes as long; fruit stipitate-ellipsoid, 6 cm. long 3. *breviflorus*

Corolla 12 cm. long or more; flowers arranged in an oblong panicle of cymes; leaves oblong, unequally subcordate at the base, triangular-acuminate, 20–30 cm. long, up to 12 cm. broad, with about 10 pairs of lateral nerves .. 4. *formosus*

Calyx divided into usually contiguous distinct teeth or lobes:

Leaves very unequal-sided and cordate or rounded at the base:

Leaves about 15 cm. long and 5–6 cm. broad, oblong, broadly acuminate, with about 10 pairs of lateral nerves; cymes few-flowered, with conspicuous subulate-lanceolate bracts; calyx-lobes subulate, about 3 mm. long; corolla 4–5 cm. long 5. *rubriflorus*

Leaves very large, over 25 cm. long and up to 25 cm. broad, ovate-elliptic, pubescent on the nerves below; cymes many-flowered, shortly pedunculate; calyx-lobes linear-filiform; corolla-tube about 15 cm. long; fruit ovoid, 3 cm. long 6. *unilocularis*

Leaves up to 17 cm. long and 8 cm. broad, oblong, broadly acuminate, very unequal-sided at the base; cymes few-flowered; corolla-tube 15 cm. long; fruit stipitate, obovoid, 5 cm. long.. .. .. .. .. .. .. 7. *tubiflorus*

Leaves cuneate or narrowly rounded and subequal-sided at the base:

Inflorescence many-flowered; leaves oblong or oblong-elliptic, broadly acuminate, 15–18 cm. long, up to 9 cm. broad, with 8–9 pairs of lateral nerves; corolla-tube about 5 cm. long; bracts ovate-lanceolate, 5 mm. long, ciliate; fruit stipitate, obovoid, 4 cm. long.. .. .. .. .. .. .. 8. *speciosus*

Inflorescence few (up to about 10)-flowered; leaves oblong, acutely acuminate, 10–15 cm. long, 5–6 cm. broad, with about 5 pairs of lateral nerves pubescent in their axils; corolla-tube 8–9 cm. long; bracts triangular-lanceolate, acuminate, 3–4 mm. long, not ciliate .. .. .. .. .. .. .. 9. *tenuis*

1. **Oxyanthus laxiflorus** *K. Schum.* ms. A shrub with glabrous leaves and cymes of slender tubular white flowers 1–1½ in. long.
S. Nigeria: Eket! Oban! Also in Cameroons. Exsicc.—*Talb.* 1314; 1359; 2034.

2. **O. gracilis** *Hiern*—F.T.A. 3 : 109. A shrub about 8 ft. high, with slender glabrous branches and slender white tubular flowers 2 in. long in short axillary cymes.
Fernando Po (Apr.)! Exsicc.—*Mann* 389.

3. **O. breviflorus** *Benth.*—F.T.A. 3 : 109. A glabrous shrub about 6 ft. high with rather stout slightly angled branches, fairly large leaves and narrow flowers 1 in. or more long.
Gold Coast: near Accra! S. Nigeria: Onitsha! Eket! Fernando Po, Gutwok Bay (Nov.)! Exsicc.—*T. Vogel* 209. *Moloney*. *Talb.* 3310. *Kennedy* 153.

4. **O. formosus** *Hook. f.* Ic. Pl. tt. 785–6.—F.T.A. 3 : 109; Stapf 611; Chev. Bot. 325. A shrub of forest undergrowth, up to 15 ft. high, with stout but soft-wooded glabrous branchlets and very long slender white fragrant flowers 4–7 or more in. long.
Sierra Leone: Njala (July)! Liberia: Cape Palmas (July)! Ivory Coast: Bingerville, Abidjean, Dabou; Soubré (June); Grabo (July). Gold Coast: Kumasi (Apr.)! Fernando Po (Apr.)! Also in Cameroons and E. Sudan. Exsicc.—*T. Vogel* 27. *Mann* 390. *Deighton* 1168. *Vigne* 1706.

5. **O. rubriflorus** *Hiern*—F.T.A. 3 : 108. A climbing shrub, with red flowers tipped with green.
S. Nigeria: Abeokuta! Exsicc.—*Barter* 3325.

6. **O. unilocularis** *Hiern*—F.T.A. 3 : 110. A large shrub or tree with stout more or less angled branchlets becoming hollow, sometimes very large leaves coarsely hairy on the nerves, and slender tubular flowers 3–6 in. long, numerous, in short crowded cymes.
Sierra Leone: various localities (May, fr. Oct.–Nov.)! Liberia: Banga! Gold Coast: Aburi Hills (Oct.)! Obuasi (fr. Jan.)! Kumasi (Mar.)! Axim, Tukobo (Nov.)! N. Nigeria: Jebba! Wamba, Plateau Prov. (fr. Mar.)! Katsina Allah (June)! S. Nigeria: Onitsha (Oct.)! Bonny (Oct., fr. Oct.–Nov.)! Oban! Also in Cameroons and Uganda. Exsicc.—*Barter* 1075. *Mann* 506. *Sc. Elliot* 5827. *Johnson* 480. *Dalz.* 644. *Unwin* 21. *Talb.* 1416. *Thornewill* 44. *Linder* 1317.

7. **O. tubiflorus** *DC.*—F.T.A. 3 : 107; Holl. 3 : 358; Chev. Bot. 325. *O. sulcatus* Hiern. A shrub or small tree, evergreen, with pubescent branchlets and long tubular fragrant flowers up to 6–7 in. long in short axillary cymes.
French Guinea: Kindia (Mar.). Sierra Leone: Bagroo R.! Bonthe (Feb.)! Magbile (fr. Dec.)! Yungeru (Jan.)! Mano (Feb.)! Gold Coast: near Accra! Aburi! Kukerentumi, E. Akim (Mar.)! Nchenenchere (Apr.)! S. Nigeria: Lagos, Ikoyi! Lagos Colony! Ilugun! Onitsha! Exsicc.—*Afzelius*. *T. Vogel* (no number). *Barter* 1794; 3417. *Mann* (no number). *Rowland*. *Brown* 431. *Johnson* 603. *Farmar* 380. (See Appendix).

8. **O. speciosus** *DC.* F.T.A. 3 : 108; Holl. 3 : 358; Chev. Bot. 325. A shrub or tree with dark shining foliage and slender white flowers up to 2½ in. long crowded in short cymes.
Senegal! French Guinea and Sierra Leone: fairly common! Ivory Coast: Malamalasso (Mar.); Beriby (Aug.). Gold Coast: Aburi (June)! Kwahu, Abetifi, etc. (Apr., June)! Akropong, 2,000 ft. (fr. Aug.). Kumasi (May)! Assin Yan Kumasi! S. Nigeria: Lagos Colony to Rio del Rey, common! Cameroons Mt.: Buea! Extends to Angola, E. Africa and Nyasaland. Exsicc.—*Heudelot* 849. *Barter* 1852. *Mann* 509. *Thomson* 131. *Johnston* (no number). *Sc. Elliot* 5231; 5301. *Rowland*. *Millen* 23; 202. *Cummins* 1; 213. *Johnson* 138; 666. *Talb.* 3682. *Deistel* 655. (See Appendix).

9. **O. tenuis** *Stapf* in Journ. Linn. Soc. 37 : 107; Stapf 611. A glabrous shrub with rather slender branches and slender tubular flowers 3–5 in. long, few in short axillary cymes.
Sierra Leone: Madina, Limba country (Apr.)! Liberia: Sino basin! Gold Coast: Ashanti, Agogo (Apr.)! Togo: Badja! S. Nigeria: Lagos! Exsicc.—*Whyte*. *Sc. Elliot* 5571. *Vigne* 1079. *Schlechter* 12975. *Dalz.* 1052. *Foster* 83.

## 14. **MORELIA** A. Rich.—F.T.A. 3 : 112.

Branchlets glabrous; leaves oblong-elliptic, rather abruptly and obtusely acuminate, about 12 cm. long and 5–6 cm. broad, glabrous, with 5–6 pairs of lateral nerves rather sharply raised below; venation very obscure; petiole about 1 cm. long; cymes somewhat extra-axillary, short and many-flowered; bracts small, ciliate; calyx truncate and undulately lobed, shortly ciliate, 4·5 mm. long, glabrous outside or rarely pubescent; corolla 1·5 mm. long, the lobes reaching down to the top of the calyx and overlapping to the left in bud; fruit globose, 1·5 cm. diam., crowned by the short calyx .. .. .. .. .. .. .. .. *senegalensis*

**Morelia senegalensis** *A. Rich.*—F.T.A. 3: 113; Holl. 3: 359; Chev. Bot. 322. *Lamprothamnus Fosteri* Hutch. An evergreen shrub or tree up to 30 ft. or more, branching low, with white fragrant flowers $\frac{1}{2}$–$\frac{3}{4}$ in. long in abundant cymes.

Common by streams from Senegal and French Sudan to N. and S. Nigeria, extending to E. Sudan and Congo. Exsicc.—*Leprieur.* *Heudelot* 737. *T. Vogel* 8; 29; 44. *E. Vogel* 66. *Barter* 1180. *Mann* 2274. *Sc. Elliot* 4531; 5026; 5298. *Rowland.* *Elliott* 25; 175. *Foster* 4. *Dalz.* 225; 400; 639. *Vigne* 1526. *Pobéguin* 649. (See Appendix).

### 15. **FERETIA** Delile—F.T.A. 3 : 115.

Leaves appearing with or usually after the flowers, ovate-elliptic to obovate, mucronate, 4–6 cm. long, 2–3 cm. broad, pubescent on the nerves below when young; flowers clustered on the usually leafless shoots; bud-scales (perulae) broadly ovate, dry; pedicels 0·5–1 cm. long, with one or two bracteoles towards the apex; calyx glabrous, lobes linear-lanceolate, 2·5 mm. long; corolla widely expanded from a short cylindrical base, 1·5–2 cm. long; anthers wholly exserted, very long (nearly 1 cm.); fruit globose, stalked, about 8 mm. diam. .. .. .. .. *canthioides*

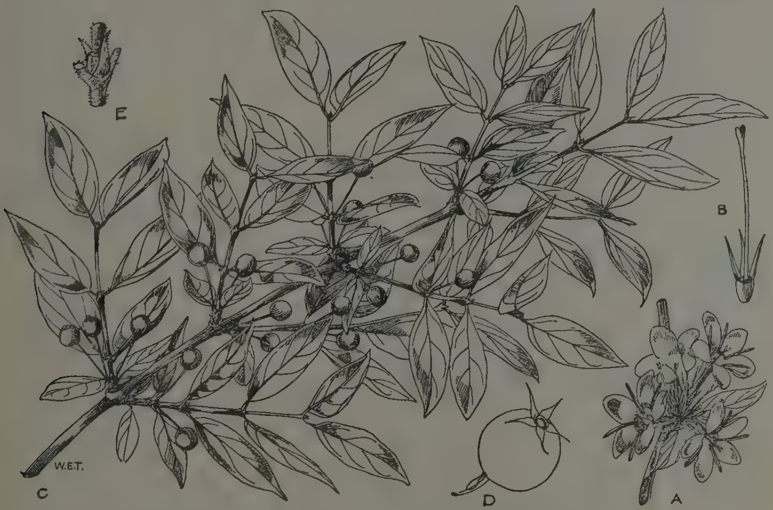

FIG. 201.—FERETIA CANTHIOIDES *Hiern* (RUBIACEAE).
A, flowers. B, pistil. C, fruiting shoot. D, fruit. E, stipules.

**F. canthioides** *Hiern*—F.T.A. 3 : 116; Chev. Bot. 326. *F. apodanthera* A. Chev. A bushy shrub a few feet high, with sweetly-scented creamy flowers abundant on short lateral shoots usually while leafless.

French Sudan: Dialocoro! Bobo-Dioulasso (May)! Tiédiana! Sansanding! Koulikoro! Senegal: ? locality! Gambia! Gold Coast: N. Terr. several localities (Mar.–May)! N. Nigeria: fairly common (Mar.–May)! Also in Shari-Chad. Exsicc.—*Heudelot* 436. *Barter* 1242. *Dalz.* 38; 91; 164. *Ryan* 24; 54. *Hill* 39. *Kitson* 676; 682; 766. *Hayes* 551. *Chev.* 705. (See Appendix).

### 16. **POUCHETIA** A. Rich.—F.T.A. 3 : 161.

Flowers in short axillary inflorescences; leaves oblong-elliptic, broadly acuminate, 6–9 cm. long, 2·5–4·5 cm. broad, pubescent only in the axils of the 4–5 pairs of lateral nerves; petiole about 6 mm. long; calyx-teeth glabrous, very short, triangular; corolla-tube 5 mm. long, gradually widened upwards, lobes elliptic; fruits ellipsoid, acute, nearly 1 cm. long .. .. .. .. .. .. 1. *africana*

Flowers in narrow spiciform panicles usually much longer than the leaves; leaves broadly oblong-elliptic, rather abruptly acuminate, 7–14 cm. long, 3–6 cm. broad, glabrous in the axils of the 6–8 pairs of lateral nerves; petiole 5 mm. long; inflorescence puberulous all over; calyx and corolla puberulous, the latter very short 2. *parviflora*

1. **Pouchetia africana** *DC.*—F.T.A. 3 : 117 ; Chev. Bot. 325. A shrub or small tree up to 15 ft. or more high, glabrous, with greenish white flowers ⅓ in. long, and black-purple berries.
French Sudan : Katou ! Senegal : Nguer (Dec.) ! ? localities ! French Guinea : Konakry (cult.) ! Sierra Leone : Freetown (Oct., fr. Mar., June) ! Bagroo R. ! Kokuna, Scarcies (fr. Jan.) ! Mofari (fr. Jan.) ! Surinuia, Talla Hills (Apr.) ! Gold Coast : N. Terr., Durimo (fr. Mar) ! Sambisi to Hamboi (May) ! Prang (Jan.) ! Bou, West. Prov. (Nov.) ! N. Nigeria : Borgu ! Exsicc.—*Heudelot* 682. *T. Vogel* 85. *Barter* 714. *Mann* (no number). *Sc. Elliot* 4436 ; 4727 ; 4742 ; 5527. *Kitson* 793 ; 943. *Vigne* 1419 ; 1562.

2. **P. parviflora** *Benth.*—F.T.A. 3 : 117. *Feretia virgata* K. Schum. A shrub or small tree like the last.
Sierra Leone : Talla Hills, Lumbaraya, up to about 3,000 ft. (Feb.) ! Fernando Po, in hedges ! Also in Prince's Island. Exsicc.—*T. Vogel* 183 ; 252. *Barter* 2065. *Sc. Elliot* 4989.

## 17. **TRICALYSIA** A. Rich.—F.T.A. 3 : 117.

Style glabrous :

Calyx more or less deeply lobed, lobes densely pubescent ; leaves elliptic, broadly acuminate, subacute at the base, 10–14 cm. long, 4–5·5 cm. broad, glabrous except in the axils of the 4–5 pairs of lateral nerves ; stipules broadly truncate with a long linear cusp ; bracts leafy, lanceolate ; corolla 1 cm. long ; fruit stalked 1. *bracteata*

Calyx truncate or minutely toothed :

Corolla rather shortly and inconspicuously hairy at the mouth :

Calyx-tube glabrous outside, truncate or slightly undulate :

Anthers far-exserted, on long filaments ; leaves oblong-elliptic, gradually acuminate, shortly cuneate at the base, 10–15 cm. long, 4–6 cm. broad, with numerous prominent transverse nerves between the 5–6 pairs of lateral nerves ; corolla-tube cylindric, the limb very acute in bud .. .. 2. *biafrana*

Anthers half-exserted, on short filaments ; leaves similar to above but laxly reticulate between the lateral nerves ; corolla-tube very short and subturbinate 3. *Hookeri*

Calyx-tube thinly pubescent towards the top, shortly toothed ; leaves oblong-elliptic, gradually long-acuminate, 15–20 cm. long, glabrous except in the axils of the 5–6 pairs of lateral nerves ; stipules cuspidate from a broad base ; corolla nearly 1·5 cm. long ; anthers long-exserted .. .. .. 4. *Elliotii*

Corolla very densely long-villous at the mouth ; lobes sharply reflexed ; style slender, far-exserted ; leaves oblong to narrowly elliptic, gradually and broadly acuminate, very shortly cuneate at the base, about 15 cm. long, 4–5 cm. broad, with about 6 pairs of lateral nerves laxly but distinctly reticulate between .. 5. *reflexa*

Style pubescent :

Corolla-lobes 12–14, abruptly reflexed ; tube 1 cm. long ; anthers 11–12, long-exserted, densely pubescent ; leaves oblong, about 20 cm. long and 8 cm. broad, with about 9 pairs of lateral nerves .. .. .. .. .. .. 6. *pleiomera*

Corolla-lobes up to 8, not reflexed ; anthers glabrous :

Calyx glabrous outside ; leaves broadly elliptic to oblong-obovate, broadly and shortly acuminate, 9–15 cm. long, 4–9 cm. broad, glabrous, very obscurely veiny between the lateral nerves ; corolla-tube and lobes villous within ; anthers exserted ; fruit ovoid-globose, nearly 1 cm. long .. .. .. .. 7. *coriacea*

Calyx pubescent outside :

Corolla-lobes densely pubescent all over the outside :

Leaves glabrous below :

Leaves obovate-elliptic to oblanceolate, rather broadly but distinctly acuminate, rather long-attenuated to the base, 8–12 cm. long, 2–5 cm. broad, pubescent only in the axils of the nerves below ; flowers about 7 mm. long 8. *pallens*

Leaves obovate-oblanceolate, broadly and obtusely pointed, long-cuneate at the base, 7–10 cm. long, 2·5–5 cm. broad, with sharply ascending lateral nerves, pubescent only in their axils ; flowers about 1·5 cm. long.. 9. *trilocularis*

Leaves densely pilose on the midrib and nerves below, broadly ovate to elliptic, subcordate at the base, broadly pointed at the apex, 8–10 cm. long, 5–6 cm. broad, strongly nervose below ; flowers subsessile, densely tomentose outside ; anthers shortly exserted ; fruits subglobose, 1 cm. diam. .. 10. *coffeoides*

Corolla-lobes pubescent outside only towards the margin :

Leaves distinctly and rather abruptly acuminate, strongly reticulate between the lateral nerves, oblong to narrowly obovate, 10–14 cm. long, 3–5 cm. broad ; anthers hairy at the tip ; calyx-teeth short and subulate but very distinct 11. *reticulata*

Leaves broadly and slightly pointed, ovate-elliptic to narrowly obovate, very laxly venose between the lateral nerves, 10–12 cm. long, 4–5 cm. broad ; corolla-tube as long as the lobes ; calyx densely pubescent, scarcely toothed 12. *Pobeguinii*

Leaves oblanceolate, obtuse at the apex, narrowed to the base, 7–9 cm. long, 2–2·5 cm. broad, with 5 pairs of ascending lateral nerves ; corolla-tube as long as the lobes ; calyx minutely tomentellous .. .. .. 13. *oblanceolata*

1. **Tricalysia bracteata** *Hiern*—F.T.A. 3 : 120 ; Chev. Bot. 327. A shrub 10–20 ft. high, glabrous except the inflorescence and nerve-axils, with small white flowers ¼–⅓ in. long crowded in short cluster-like axillary inflorescences.

Senegal ! French Guinea : Futa-Jallon, between the Konkouré and Timbo, Diaguissa Plateau, 4,000 ft. ! Sierra Leone : Talla Hills (Feb., Mar.) ! Berria (fr. Mar.) ! Gold Coast : Suku Suku ! Exsicc.—*Heudelot* 855. *Sc. Elliot* 4908 ; 5054 ; 5425 ; 5428. *Chipp* (no number).

2. **T. biafrana** *Hiern*—F.T.A. 3 : 122, partly ; Stapf 612. A small glabrous tree 12–20 ft. high, with white flowers ⅓ in. long in dense subsessile axillary clusters.
Liberia : Kakatown ! Gold Coast ! S. Nigeria : Calabar (Feb.) ! Cameroons Mt., 500 ft. (Jan.) ! Victoria ! Exsicc.—*Mann* 1212 ; 2305. *Whyte*. *Vigne* 1805. *Preuss* 1310 ; 1311.

3. **T. Hookeri** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *T. biafrana* Hiern, partly. Habit of the last with flowers in short axillary inflorescences.
S. Nigeria : Lagos Colony ! Ambas Bay (Feb.) ! Exsicc.—*Mann* 7. *Millson*.

4. **T. Elliotii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Probletostemon Elliottii* K. Schum. A small tree about 20 ft. high with white fragrant flowers 1 in. long (including corolla-lobes and tube) fairly numerous in short axillary cymes.
Sierra Leone : Lumbaraya (Feb.) ! Gold Coast : Aburi and Akwapim Hills (Feb., Nov.) ! Also in S. Cameroons and N. E. Congo. Exsicc.—*Sc. Elliot* 4937. *Johnson* 775 ; 941.

5. **T. reflexa** *Hutch.* in Kew Bull. 1915 : 44. An almost glabrous shrub or small tree with white flowers ⅓ in. long clustered in the axils, conspicuous by the woolly mouth of the corolla-tube.
Sierra Leone : Kessewe ! Excicc.—*Lane-Poole* 131.

6. **T. pleiomera** *Hutch.* in Cat. Talb. Nig. Pl. 48. A shrub or small tree with glabrous branchlets and leaves, and white flowers ⅓–½ in. long crowded in axillary subsessile cymes.
S. Nigeria : Oban ! Exsicc.—*Talb.* 1277.

7. **T. coriacea** *Hiern*—F.T.A. 3 : 120 ; Stapf 612 ; Chev. Bot. 327. A shrub of forest undergrowth in moist places, with somewhat leathery leaves and axillary clusters of fragrant white flowers ⅓ in. long.
Sierra Leone : Scarcies R., Mofari (Jan.) ! Ronietta (Nov.) ! Gbanbama ! Njala (Dec.) ! Liberia : Grand Bassa (July) ! Duport (Nov.) ! Gold Coast : Beyin (Nov.) ! Extends to Gabon. Exsicc.—*T. Vogel* 112. *Sc. Elliot* 4441. *N. W. Thomas* 5419 ; 8973. *Deighton* 1519. *Vigne* 1454. *Linder* 1501 ; 1504.

8. **T. pallens** *Hiern*—F.T.A. 3 : 121. A small tree or a shrub sometimes scrambling in undergrowth, with puberulous branchlets, small white flowers ¼ in. long in very short axillary clusters and red berries.
Ivory Coast : Middle Comoé, between Akabossué and Ebrinahoué (Dec.) ! Gold Coast : Assin Yan, Kumasi ! Lake Bosumtwi (Dec.) ! Aburi Hills (Feb.) ! Kwahu Plateau, Mpraeso ! S. Nigeria : Calabar (fr. Apr.) ! Fernando Po ! Exsicc.—*Mann* (no number). *Holl.* 103. *Cummins* 136. *Johnson* 942. *Vigne* 1497. *Kitson* 1183. *Chev.* 22607.

9. **T. trilocularis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Aulacocalyx triloculare* Sc. Elliot. A shrub 2–8 ft. high, with white fragrant flowers silky outside, in the leaf-axils or at the leafless nodes.
Sierra Leone : Scarcies R., Mofari (Jan.) ! Moria, on rocks by the river (Feb.) ! Njala, river bank (Feb.) ! Exsicc.—*Sc. Elliot* 4435 ; 4563. *Deighton* 1815.

10. **T. coffeoides** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Feretia coffeoides* A. Chev. Bot. 326. *Tricalysia jasminiflora* A. Chev. Bot. 327, not of Benth. and Hook. f. A shrub erect and branched from the base or half-scandent, with rusty-tomentose branchlets, and white fragrant flowers about ½ in. long in fascicles with pale bracts mostly below the leaves.
French Guinea : Kouroussa (Feb.) ! Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Sept.–Jan.) ! Timbo-Ditinn (Sept.). Labé (Apr.) ! Ivory Coast : Upper Sassandra, Mt. Dourou, 2,700 ft. (May). Dahomey : Atacora Mts., Somba country, 1,350–1,700 ft. (June). S. Nigeria : Ebo-Yeye ! Exsicc.—*Chev.* 12351 ; 12891 ; 18030 ; 18351 ; 18381 ; 20270 ; 20285 ; 21735 ; 24062. *Pobéguin* 641. *Farmar* 297. *Foster* 165. (See Appendix).

11. **T. reticulata** *Hiern*—F.T.A. 3 : 121 ; Chev. Bot. 327. A small tree or sometimes a lax shrub, glabrous except the inflorescence, with white flowers ¼–⅓ in. long in short cluster-like axillary cymes.
Senegal ! French Guinea : Futa-Jallon, between the Konkouré and Timbo (Mar.) ! Kala to Dalaba, 3,600 ft. (Apr.) ! Between Middle Santa and Timbo (Mar.) ! Sierra Leone : common ! Gold Coast : Nkwanta, West. Prov. (fr. Sept.) ! Exsicc.—*Heudelot* 884. *T. Vogel* 165. *Mann* 887. *Sc. Elliot* 4464b ; 4474 ; 4810 ; 5837. *Farmar* 253. *Chipp* 368.

12. **T. Pobeguinii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub erect or more or less straggling with glabrous obscurely-angled branchlets, white flowers ⅓ in. long fairly numerous in short axillary cymes, and small berries bright red when ripe.
French Guinea : Kouroussa (Jan.) ! Gold Coast : Grubé (Jan.) ! Togo : Ho (young fruit Feb.) ! Exsicc.—*Pobéguin* 638 ; 650 ; 822. *Vigne* 1580. *Howes* 1105.

13. **T. oblanceolata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub 10–12 ft. high, glabrous except the inflorescence, with small white flowers ¼ in. long, rather few in very short axillary cymes.
N. Nigeria : Bauchi Plateau, Naraguta (Nov.) ! Exsicc.—*Lely* 725.

## 18. AMARALIA[1] Welw.—F.T.A. 3 : 112 ; Wernham in Journ. Bot. 1917 : 1.

Leaves subcordate at the base ; flowers large ; corolla 6–7 cm. long, 3 cm. broad when flattened out ; calyx-lobes oblong, 2·5 cm. long, closely striate, finely puberulous outside ; leaves obovate-elliptic, obtuse, 12–15 cm. long, 6–10 cm. broad, with 6–7 pairs of lateral nerves, glabrous ; stipules ovate-oblong, about 1 cm. long 1. *heinsioides*

Leaves not subcordate at the base ; flowers smaller :
- Calyx-lobes overlapping in the open flower :
  - Lateral nerves about 10 pairs or more ; leaves pubescent below especially on the nerves, elliptic, with a triangular apex, 10–16 cm. long, 5–8 cm. broad ; calyx-lobes obovate-oblong, 1·5 cm. long, closely silky-pilose outside ; receptacle (ovary) ribbed ; corolla about 3·5 cm. long .. .. .. .. 2. *Zenkeri*
  - Lateral nerves about 6 pairs :
    - Corolla 2 cm. long, densely rather long-appressed-pilose outside ; leaves oblong-oblanceolate, subacute, 8–12 cm. long, 2–4·5 cm. broad, slightly pubescent on the nerves below ; calyx-lobes not striate, 1·3 cm. long .. .. 3. *calycina*
    - Corolla 3 cm. long or more, very shortly pubescent ; calyx-lobes broadly ovate-elliptic, prominently ribbed, 1·5–2 cm. long ; leaves oblong to elliptic, up to 14 cm. long and 5 cm. broad, glabrous or nearly so on the nerves below ; fruit oblong, slightly ribbed .. .. .. .. .. .. 4. *Sherbourniae*

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[1] Either this genus should be included in *Randia* or certain species of *Randia* should be included here; see footnote under *Gardenia*, p. 72.

Calyx-lobes not overlapping in the open flower :

Leaves oblanceolate, long-attenuated to the base, broadly acuminate, 8–12 cm. long, 2·5–4 cm. broad, minutely and very sparsely pubescent below ; receptacle (ovary) ribbed ; calyx-lobes about 7 mm. long, ribbed, nearly glabrous ; corolla 2·5 cm. long .. .. .. .. .. .. .. .. .. 5. *micrantha*

Leaves elliptic-obovate, shortly cuneate at the base, shortly and broadly acuminate, 10–16 cm. long, 4·5–8 cm. broad, minutely pubescent below ; receptacle (ovary) ribbed ; calyx-lobes as above ; fruit curved, cylindric, about 4 cm. long, ribbed 6. *Millenii*

1. **Amaralia heinsioides** *Wernham* in Journ. Bot. 1917 : 5. *Randia heinsioides* Schweinf. ex Hua. *Sherbournia bignoniaeflora* Hua, partly. A broad-leaved climbing shrub with wide-tubular flowers 2–2½ in. long, the corolla red or red-purple inside, whitish outside, sepals large and almost leafy.
Sierra Leone : Kafogo (Apr.) ! Gold Coast : Obuasi (Mar.) ! S. Nigeria : near Lagos ! Also in Upper Welle region. Exsicc.—*Sc. Elliot* 5602. *Rowland. Chipp* 149.

2. **A. Zenkeri** *Wernham* l.c. 6. *Sherbournia Zenkeri* Hua. A climbing shrub with flowers like the last but under 2 in. long.
S. Nigeria : Benin, Ipopon (Apr.) ! Oban ! Eket. Degema. Ambas Bay (Feb.) ! Also in French Cameroons. Exsicc.—*Mann* 1329. *Farquhar* 198. *Talb.* 202 ; 269 ; 3603 ; 3740.

3. **A. calycina** *K. Schum* in Engl. Pflanzenf. 4, 4 : 78 ; Wernham l.c. 4. *Gardenia calycina* G. Don. *Randia Doniana* Benth. *A. bignoniaeflora* Hiern F.T.A. 3 : 112, partly. A climbing shrub like the last but with flowers only about 1 in. long.
Sierra Leone ! Exsicc.—*Don.*

4. **A. Sherbourniae** *Wernham* l.c. 4. *Gardenia Sherbourniae* Hook. f. Bot. Mag. t. 4044. *Randia Sherborniae* Hook. *Sherbournia foliosa* G. Don ; Chev. Bot. 324. *S. calycina* Hua ; Chev. Bot. 324. *A. bignoniaeflora* Hiern, F.T.A. 3 : 112, partly. *A. Huana* Wernham. A climbing shrub with white or pinkish flowers, darker-spotted in the tube, 1½–2 in. long.
French Guinea : Guerzé country, between Lola and Nzo (Mar.) ! Kouria ; Kaba valley. Sierra Leone : common ! Liberia : Monrovia ! Sino basin ! Dukwia R. (Mar.) ! Ivory Coast : Bingerville ; Guidéko ; Aboisso ; confluence of the Davo with the Sassandra. Gold Coast : Assin Yan Kumasi ! S. Nigeria : Epe ! Oyo (May) ! Also in Cameroons. Exsicc.—*Barter* (no number). *Mann* 819. *Millson. Sc. Elliot* 4110 ; 4602 ; 5763. *Whyte. G. P. Cooper* 328. *Chev.* 20985. (See Appendix).

5. **A. micrantha** *Wernham* l.c. 6. A climbing shrub with red flowers 1 in. long, solitary in the axils.
S. Nigeria : Oloke Meji ! Exsicc.—*Foster* 295.

6. **A. Millenii** *Wernham* l.c. 6. A climbing shrub like the last with solitary axillary flowers 1½ in. long.
S. Nigeria : Iddo ! Ebute Metta (Dec.) ! Oban ! Exsicc.—*Millen* 31 ; 143. *Talb.* 202.

## 19. LEPTACTINA Hook. f.—F.T.A. 3 : 87.

Style included in the corolla-tube ; branchlets glabrous or tomentellous ; leaves obovate or obovate-elliptic, acutely acuminate, broadly wedge-shaped at the base, 10–20 cm. long, 6–11 cm. broad, glabrous to softly pubescent below, with 8–12 pairs of lateral nerves ; stipules variable, more or less ovate-lanceolate, acute ; flowers in dense heads ; ovary tomentose or glabrous (var. *glabra*) ; calyx-lobes narrowly lanceolate, ciliate and shortly pubescent or nearly glabrous, about 1·5–2·5 cm. long, striate ; corolla up to 10 cm. long, slender, tomentose outside .. 1. *densiflora*

Style exserted ; branchlets tomentellous when young ; leaves elliptic-lanceolate, acute at both ends, 7–9 cm. long, 3–4 cm. broad, softly pubescent below mainly on the 5–7 pairs of lateral nerves ; stipules broadly ovate, caudate-acuminate, about 1·5 cm. long ; flowers few ; ovary tomentose ; calyx-lobes narrowly lanceolate, 1·5 cm. long, pubescent outside ; corolla 7 cm. long, slender, densely pilose outside 2. *senegambica*

1. **L. densiflora** *Hook. f.*—F.T.A. 3 : 87. A large bushy shrub with rather large leaves, and white fragrant tubular flowers 1–3 in. long, velvety outside, in dense heads ; fruits black, ribbed and wrinkled, ½ in. diam., crowned by the long calyx.
Sierra Leone : Yonibana (Nov.) ! Mabonto (Oct.) ! Mamaha (Nov.) ! Liberia : Gbanga (Sept.) ! Gold Coast : ? locality ! S. Nigeria : Lagos, Ikoyi (Aug.) ! Lagos Colony, several localities ! Abeokuta ! Degema ! Oban ! Okuni (Jan.) ! Exsicc.—*Irving* 94. *Millen* 23 ; 32 ; 122 ; 148 ; 181. *Rowland. Holland* 208. *Farmar* 463a. *N. W. Thomas* 3542 ; 4396 ; 4861 ; 4908 ; 5031. *Linder* 617.

var. **glabra** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Ovary glabrous.
Gold Coast : various localities ! Exsicc.—*Cummins* 150. *Johnson* 512. *Moor* 130. *Chipp* 230. *Fishlock* 76. *Vigne* 1391 ; 1407.

2. **L. senegambica** *Hook. f.*—F.T.A. 3 : 88 ; Chev. Bot. 318. A shrub with rather stiff subquadrangular branchlets, dark shining foliage, and greenish flowers 1–2½ in. long, softly hairy outside in small dense cymes.
French Sudan : Moussaia ! Senegal ! French Guinea : Kouroussa (Feb., Apr.) ! Kindia ! Labé, etc. ! Sierra Leone : Kofui Mt., Scarcies (Jan.) ! Makumro (June) ! Exsicc.—*Afzelius. Heudelot* 893. *Sc. Elliot* 4759. *N. W. Thomas* 504. *Pobéguin* 220 ; 678. (See Appendix).

## 20. BELONOPHORA Hook. f.—F.T.A. 3 : 129.

Corolla-tube 1 cm. long, minutely and sparsely pubescent ; branchlets glabrous ; leaves ovate-lanceolate, gradually acute, shortly cuneate at the base, 10–15 cm. long, 4–6 cm. broad, glabrous, with 5–6 pairs of lateral nerves, very obscurely venose between ; stipules long-linear-subulate, 1 cm. long ; flowers subtended by several overlapping minutely ciliolate bracts ; calyx-lobes broadly ovate, about 1·5 mm. long ; anthers inserted about the middle of the corolla-tube .. .. .. 1. *Morganae*

Corolla-tube 1·5 cm. long :

Branchlets puberulous ; leaves obovate-elliptic, gradually acuminate, auriculate at the base, about 30 cm. long and 10 cm. broad, glabrous, with about 12 pairs of prominent lateral nerves ; flowers few in axillary clusters ; bracts broadly ovate-triangular, with jagged margins ; calyx-lobes broadly ovate-triangular, 4 mm. long ; corolla lobes oblong, 1 cm. long ; anthers inserted above the middle of the tube ; ovules 2 in each cell .. .. .. .. .. 2. *Wernhamii*

Branchlets glabrous ; leaves as in *B. Morganae* ; corolla-tube 1·5 cm. long, lobes 1 cm. long ; anthers inserted slightly above the middle of the tube ; calyx-lobes 1·5 mm. long .. .. .. .. .. .. .. .. .. 3. *lepidopoda*

1. **B. Morganae** *Hutch.* in Kew Bull. 1921 : 249. A small shrub with (white ?) tubular flowers ½ in. long, 3 or 4 together, subsessile in the axils.
   N. Nigeria : Bauchi Plateau, Jos ! Exsicc.—*Mrs. Cope Morgan.*
2. **B. Wernhamii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Diplosporopsis coffeoides* Wernham. Cat. Talb. Nig. Pl. 47, t. 8. A glabrous tree with rather large leaves and white flowers ¾ in. long, few in axillary clusters.
   S. Nigeria : Oban ! Exsicc.—*Talb.* 1649.
3. **B. lepidopoda** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Kerstingia lepidopoda* K. Schum. A small tree with white flowers.
   French Guinea : Keuté, Futa Jallon (April) ! Sierra Leone : no locality ! Togo : Sokode-Basari, Loso (Apr.) ! Exsicc.—*Chev.* 18124. *Smythe* 132. *Kersting* 362 (64).

## 21. AULACOCALYX Hook. f.—F.T.A. 3 : 129.

Branchlets appressed-pubescent ; leaves elliptic, acutely acuminate, acute at the base, 8–12 cm. long, 3–5 cm. broad, thinly pilose on the 2–3 pairs of lateral nerves beneath, with numerous closely parallel very fine transverse nerves between spreading at right angles to the midrib ; petiole pubescent, 5 mm. long ; flowers paired, subsessile ; calyx about 1 cm. long, lobes triangular-subulate, about ⅓ as long as the tube ; corolla 5 cm. long, silky outside ; anthers exserted .. .. *jasminiflorus*

**A. jasminiflorus** *Hook. f.* Ic. Pl. t. 1126.—F.T.A. 3 : 129. A straggling shrub with pale obliquely-nerved leaves and tubular flowers 1–1½ in. long, silvery- or yellowish-tomentose.
Liberia : Kakatown! Dukwia R.( Oct., Nov.) ! Gold Coast: Pusupusu (Nov.) ! Cameroons Mt. : Buea ! Extends to Gabon. Exsicc.—*Whyte.* *McAinsh* 1572. *G. P. Cooper* 90 ; 142. *Maitland* 493 ; 456. (See Appendix).

## 22. CREMASPORA Benth.—F.T.A. 3 : 126.

Style glabrous ; leaves glabrous below :
  Flowers sessile ; calyx-lobes broad ; calyx, ovary and branchlets glabrous ; leaves with pits in the axils of the 4–5 pairs of lateral nerves, broadly caudate-acuminate, acute at the base, 6–8 cm. long, 2·5–3·5 cm. broad ; corolla-tube 4 mm. long 1. *glabra*
  Flowers pedicellate ; calyx-lobes filiform ; calyx, ovary, pedicel and branchlets scabrid-puberulous ; leaves without pits, broadly caudate-acuminate, acute at the base, 10–13 cm. long, 3·5–4·5 cm. broad ; corolla-tube 5 mm. long 2. *Wernhamiana*
Style pubescent ; leaves pubescent on the nerves below :
  Flowering branchlets shortly pubescent ; corolla-tube usually pubescent, 6 mm. long ; anthers 6 mm. long, leaves oblong or oblong-elliptic, broadly acuminate, rounded to subacute at the base, 6–10 cm. long, 2·5–5 cm. broad ; lateral nerves about 5 pairs ; fruit ellipsoid, 1 cm. long, glabrous .. .. .. .. .. 3. *triflora*
  Flowering branchlets rather long-pilose ; corolla-tube glabrous :
    Leaves rather elongate-oblong-elliptic, acutely acuminate, subacute at the base, 6–10 cm. long, 2–4 cm. broad, pubescent on the midrib above ; lateral nerves 5–7 pairs, impressed above ; branchlets with two lengths of hairs ; corolla-tube 4 mm. long .. .. .. .. .. .. .. .. .. 4 *Talbotii*
    Leaves shortly oblong-elliptic, shortly acuminate, rounded at the base, 3–8 cm. long, 2–3·5 cm. broad, long-pilose on the midrib and 5–6 pairs of lateral nerves below ; branchlets long-pilose ; corolla-limb pubescent.. .. .. 5. *Thomsonii*

1. **Cremaspora glabra** *Wernham* in Cat. Talb. Nig. Pl. 48. A nearly glabrous shrub with white flowers ⅓ in. long, few in sessile axillary clusters.
   S. Nigeria : Eket ! Oban ! Exsicc.—*Talb.* 1536 ; 3200.
2. **C. Wernhamiana** *Hutch. & J. M. Dalz.* in Kew Bull. 1913 : ined. *Coffea Talbotii* Wernham.
   S. Nigeria : Oban ! Exsicc.—*Talb.* 1620.
2. **C. triflora** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Psychotria triflora* Thonn. *C. africana* Benth.—F.T.A. 3 : 126 ; Holl. 3 : 359 ; Chev. Bot. 327. A fair-sized shrub with rusty-pubescent, usually spreading and more or less straggling branches, fragrant white subsessile flowers ½ in. long and usually several together in the axils, and black-purple berries.
   Fairly common from French Guinea (Futa-Jallon) to S. Nigeria and Eastern Sudan south to Gazaland and Angola. Exsicc.—*Barter* 3333. *Moloney.* *Rowland.* *Sc. Elliot* 4246 ; 5120 ; 5563 ; 5598. *Millen* 56. *Foster* 4. *Johnson* 699. *Chev.* 498 ; 771 ; 12505 ; 12506 ; 12554 ; 17834 ; 21866. *Warnecke* 415. (See Appendix).
4. **C. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 49. A shrub erect or half-straggling with rusty-pubescent branchlets and small white sessile flowers 2–6 together in axillary clusters.
   S. Nigeria : Oban ! Exsicc.—*Talb.* 287.
5. **C. Thomsonii** *Hiern*—F.T.A. 3 : 126. A climbing shrub with brown-hirsute branchlets with white flowers ½ in. long, few, sessile in axillary clusters.
   S. Nigeria : Calabar ! Oban ! Exsicc.—*Thomson* 94. *Talb.* 1049.

## 23. POLYSPHAERIA Hook. f.—F.T.A. 3 : 127.

Branchlets glabrous ; leaves lanceolate or narrowly ovate-lanceolate, gradually tapered at the apex, shortly cuneate at the base, 10–16 cm. long, 3–6 cm. broad, glabrous, with about 10 pairs of looped lateral nerves, laxly reticulate ; flower-clusters axillary, very shortly pedunculate ; calyx turbinate, obconic, undulately lobed ; corolla 1 cm. long, densely pubescent inside ; anthers subsessile, not exserted ; style pubescent ; fruit ellipsoid-globose, near 1 cm. diam., capped by the cupular persistent calyx
1. *arbuscula*

Branchlets glabrous; leaves broadly elliptic, abruptly long-acuminate, broadly cuneate or rounded at the base, 15–17 cm. long, 7–8 cm. broad, with 9–11 pairs of lateral nerves; corolla-buds apiculate; fruit broadly ellipsoid-globose, nearly 1·5 cm. long .. .. .. .. .. .. .. .. .. 2. *macrophylla*

1. **Polysphaeria arbuscula** *K. Schum.* in Engl. Bot. Jahrb. 33: 349. *P. pedunculata* K Schum. *P. lagosensis* A. Chev. A shrub or small tree with rather long narrow leaves and axillary clusters of short whitish flowers.
Gold Coast: Aburi! Afram Plains (May)! Togo: Sokode-Basari, etc.! N. Nigeria: Zungeru (June)! Abinsi (July)! S. Nigeria: Lagos! Olokemeji! Also in French Cameroons. Exsicc.—*Dalz.* 213; 637. *Foster* 85. *Anderson* 44. *Kitson* 1083; 1112; 1122. *Chev.* 14032; 14049. *Kersting* 169; 262; 385; 623. *Busse* 3543.
2. **P. macrophylla** *K. Schum.* l.c. 349.
S. Nigeria: Victoria! Cape Debunscha! Exsicc.—*Preuss* 1382. *Jungner* 116.

## 24. IXORA Linn.—F.T.A. 3: 162.

Corolla-tube in the open flower 4–7 cm. long:

Leaves subsessile, elliptic, rounded at the base, the uppermost pair ovate-elliptic, rounded or subcordate at the base, 15–20 cm. long, 7–10 cm. broad, glabrous, with about 10 pairs of lateral nerves with reticulate venation between; flowers numerous in a close terminal corymb; calyx subtruncate; corolla-tube 5–7 cm. long, slender; lobes oblong, about 8 mm. long; style exserted, stigma deeply bifid; fruit about 1 cm. diam. .. .. .. .. .. .. .. .. .. 1. *radiata*

Leaves petiolate, narrowly obovate-elliptic, cuneate at the base, gradually and acutely-acuminate, 12–15 cm. long, 4–6 cm. broad, glabrous, with about 8 pairs of lateral nerves; petiole about 1 cm. long; flowers in a lax terminal corymb; calyx subtruncate; corolla 4 cm. long, very slender, lobes 6–7 mm. long 2. *degemensis*

Corolla-tube in the open flower up to 3 cm. long:

Corolla-tube 2–3 cm. long:

Calyx rather deeply lobate-toothed:

Flowers crowded in dense flat cymes on long peduncles; bracts subulate-lanceolate, about 5 mm. long; corolla-tube 2 cm. long, lobes narrowly oblong, acute, about 8 mm. long; leaves narrowly to broadly oblong, long-acuminate, shortly cuneate at the base, the uppermost pair ovate-oblong, cordate at the base, up to 30 cm. long and 11 cm. broad, glabrous, with very numerous pairs of lateral nerves 3. *congesta*

Flowers arranged in very lax pedunculate cymes; bracts triangular, short; corolla-tube about 3 cm. long, lobes broadly oblong-elliptic; leaves oblong, acutely acuminate, suddenly acute at the base, 12–20 cm. broad, glabrous, with numerous pairs of spreading lateral nerves.. .. .. .. .. 4. *laxiflora*

Calyx truncate or subtruncate:

Flowers sessile or subsessile in the cymules:

Corolla-tube 3 cm. long, very slender; leaves acute at the base, oblong-lanceolate, gradually acute, 14–15 cm. long, 4–5 cm. broad, glabrous, with about 12 pairs of spreading much-branched lateral nerves; petiole 1 cm. long; stipules rounded, abruptly apiculate .. .. .. .. .. .. .. 5. *Hiernii*

Corolla-tube 2·5 cm. long, slender; leaves as above but broadly rounded at the base .. .. .. .. .. .. .. .. .. 6. *Linderi*

Flowers rather long-pedicellate in the cymules; corolla-tube 2 cm. long, slender; leaves oblong, acute or broadly acuminate, abruptly acute at the base, 12–20 cm. long, 4–8 cm. broad, with numerous much-branched lateral nerves spreading almost at right angles; stipules rounded, long-apiculate .. 7. *brachypoda*

Corolla-tube up to 1·5 cm. long:

Pedicels and calyx shortly pubescent; calyx-lobes subulate, 2 mm. long; corolla-lobes longer than the tube; leaves elliptic, oblique at the base, acuminate, 8–14 cm. long, 3–6 cm. broad, hairy in the axils of the 6–7 pairs of lateral nerves, drying black; petiole slender, 1·5 cm. long; inflorescence very lax and rather few-flowered 8. *bipindensis*

Pedicels glabrous or if minutely pubescent then the calyx very shortly lobed or truncate:

Corolla-lobes shorter than the tube, the latter 1–1·5 cm. long:

Calyx distinctly lobed or toothed:

Lateral nerves 3–4 pairs:

Lateral nerves very prominent below, sharply ascending and looped; leaves ovate to obovate, unequal-sided at the base, acutely acuminate, 6–11 cm. long, 3–7 cm. broad, blackish when dry; petiole 0·5 cm. long; inflorescence very few-flowered; corolla-tube 1·5 cm. long, lobes 1 cm. long .. 9. *atrata*

Lateral nerves not prominent below; leaves elliptic, long-caudate-acuminate (acumen subspathulate), 6–10 cm. long, 3–4·5 cm. broad, shortly acute at the base, glabrous; inflorescence very lax, pedicels up to 3 cm. long, very slender; calyx-lobes ciliate; corolla-tube 10–12 mm. long, lobes 8 mm. long 10. *laxissima*

Lateral nerves more numerous, spreading and usually rather faint :
Bracts broadly subulate, persistent ; style-arms thick ; leaves broadly-oblong-oblanceolate to broadly elliptic, cuneate to subrounded at the base, 5–15 cm. long, 2·5–5 cm. broad, with 10–12 pairs of lateral nerves ; corolla-tube 1–1·5 cm. long, lobes 8 mm. long .. .. .. .. .. .. 11. *foliosa*
Bracts minute and deciduous ; style-arms very slender ; flowers crowded ; corolla-tube slender, 1·5 cm. long ; leaves broadly oblanceolate, not acuminate, 7–12 cm. long, 3–4·5 cm. broad, with about 10 pairs of faint branched lateral nerves ; fruits 2-lobed, about 0·5 cm. broad .. .. 12. *bauchiensis*
Calyx truncate or with very minute teeth ; bracts small and deciduous :
Leaves broadly triangular at the apex, broadly oblong-elliptic, about 15 cm. long and 6 cm. broad, with about 8 pairs of lateral nerves ; flowers rather few in a small inflorescence ; corolla-tube rather stout .. .. 13. *guineensis*
Leaves rather gradually pointed, elliptic to lanceolate, acute at the base, up to 17 cm. long, 3–7 cm. broad, with about 8 pairs of lateral nerves ; flowers rather numerous in a branched inflorescence ; corolla-tube slender .. 14. *riparia*
Corolla-lobes about as long as or longer than the tube, the latter less than 1 cm. long ; calyx shortly toothed :
Leaves very shortly petiolate (petiole 3 mm.), obliquely elliptic, subacute, rounded at the base, 5–8 cm. long, 2–4 cm. broad, with about 5 pairs of lateral nerves ; flowers few in a lax cyme ; pedicels about 5 mm. long ; calyx lobed 15. *Thomsonii*
Leaves long-petiolate, with 8 or more pairs of lateral nerves :
Leaves broadly subacute, not acuminate, very acute at the base, 10–18 cm. long, 4–6 cm. broad, with prominently looped and branched lateral nerves ; pedicels 3 mm. long, puberulous ; fruit subglobose, 8 mm. diam. .. 16. *breviflora*
Leaves acuminate ; pedicels 1–1·5 cm. long :
Corolla-tube exserted from the calyx :
Leaves gradually acute at the base, oblong-elliptic, 10–16 cm. long, 3·5–6 cm. broad, with about 9 pairs of lateral nerves ; flowers few in short cymes ; calyx-lobes very acute .. .. .. .. .. .. 17. *brachysiphon*
Leaves abruptly acute at the base, oblong, 12–20 cm. long, 3–8 cm. broad, with 10–12 pairs of spreading lateral nerves ; flowers in very slender lax cymes ; calyx-lobes broadly triangular .. .. .. .. .. 18. *rosea*
Corolla-tube not exserted from the calyx, very short ; ultimate branches of the inflorescence 3-flowered ; leaves oblong or oblong-elliptic, broadly acuminate, shortly acute at the base, 10–15 cm. long, 3·5–6 cm. broad, with about 12 pairs of spreading lateral nerves ; calyx-lobes broadly triangular 19. *divaricata*

1. **Ixora radiata** *Hiern*—F.T.A. 3 : 163 ; Stapf 612 ; Chev. Bot. 333. *I. capitata* A. Chev. A glabrous shrub 12–20 ft. high, with slender tubular flowers 3 in. long, white, wine-red outside, in a dense terminal corymb.
Gambia ! French Sudan : Upper Volta, Bobo-Dioulasso ! French Guinea : between the Santa and Timbo ! Sierra Leone : common ! Liberia ! Ivory Coast : Baoulé-Nord, Bouaké (July) ! N. Nigeria : Lom, Nupe ! Kontagora (Dec.) ! S. Nigeria : Lagos ! Aligere (Feb.) ! Eket ! Also in Shari-Chad, E. Sudan, and Zanzibar Island. Exsicc.—*Barter* 1236 ; 2210. *Sc. Elliot* 3958 ; 4306 ; 4520 ; 4780 ; 5024 ; 5283 ; 5879. *Moloney. Millen* 149. *Smythe* 57. *Talb.* 3269. *Chev.* 22081 ; 22129. (See Appendix).
2. **I. degemensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1831 : ined. A shrub, glabrous, with slender tubular red-tinged flowers, 2–3 in. long, numerous in a terminal corymb.
S. Nigeria : Degema ! Exsicc.—*Talb.* 3773 ; 3767.
3. **I. congesta** *Stapf* in Journ. Linn. Soc. 37 : 107 ; Stapf 612. A glabrous shrub with (sometimes) long acuminate leaves, and white flowers over 1 in. long in dense cymes on a long stout peduncle.
Liberia : Sino basin ! Dukwia R. ! Exsicc.—*Whyte. G. P. Cooper* 201.
4. **I. laxiflora** *Smith*—F.T.A. 3 : 164, partly ; Chev. Bot. 333. A tree up to 20–30 ft. high, by streams, or sometimes a lax shrub, with flowers 1½–2 in. long, white with red-tinged tube, in pendulous cymes.
Common from French Guinea to Gold Coast ! Exsicc.—*Barter* (no number). *Mann* (no number). *Middleton. Whitfield. Sc. Elliot* 3935. *Cummins* 104. *Johnson* 767. *Pobéguin* 893.
5. **I. Hiernii** *Scott Elliot* in Journ. Linn. Soc. 30 : 82. A shrub with slender white flowers like the last.
Sierra Leone : Scarcies, Kofiu (Jan.) ! Exsicc.—*Sc. Elliot* 4596.
6. **I. Linderi** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A bush 6–8 ft. high ; flowers white, pinkish on outside of corolla-lobes.
Liberia : Monrovia, sandy soil near the beach (Nov.) ! Exsicc.—*Linder* 1536.
7. **I. brachypoda** *DC.* Prodr. 4 : 488. *I. laxiflora* Hiern—F.T.A. 3 : 164, partly ; Stapf 612, not of Smith. A glabrous shrub or small tree with white red-tinged flowers and red berries very much like *I. laxiflora*.
French Guinea : Kouroussa (Apr.) ! Sierra Leone : Freetown (June) ! Liberia : several localities ! Exsicc.—*T Vogel* 6 ; 61 ; 73 ; 142. *Ansell. Whyte. Pobéguin* 269.
8. **I. bipindensis** *K. Schum.* MS. A shrub with wiry branches and slender flowers ¾–1 in. long in lax cymes, and petioles twisted as for climbing ; the whole plant turning black in drying.
S. Nigeria : Lagos Colony ! Fernando Po (Jan.) ! Also in Cameroons. Exsicc.—*Mann* 212. *Rowland.*
9. **I. atrata** *Stapf* in Journ. Linn. Soc. 37 : 108 ; Stapf 612. *Rutidea atrata* Mildbr. ms. ? A half-climbing shrub with slender spreading branchlets, conspicuously few-nerved leaves turning black, and white narrow-tubular flowers about 1 in. long.
Sierra Leone : Mt. Aureole ! Kennema ! Liberia : Monrovia ! Exsicc.—*Whyte. Lane-Poole* 362 ; 456.
10. **I. laxissima** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Chomelia laxissima* K. Schum. A glabrous climbing shrub with wiry branchlets, and white flowers nearly 1 in. long.
S. Nigeria : Oban ! Barombi (June) ! Exsicc.—*Preuss* 312. *Talb.* 232.
11. **I. foliosa** *Hiern*—F.T.A. 3 : 166. A tree up to 25 ft. or more high, with white or pink fragrant flowers ¾ in. long in dense trichotomous cymes.
Cameroons Mt., in forest, 5,000–6,500 ft. (Dec. to Mar.) ! Bamenda, 6,500 ft. (Feb.) ! Exsicc.—*Mann* 2154. *Preuss* 665. *Maitland* 198 ; 208 ; 514. *Migeod* 469 ; 470. *Mildbr.* 10820.
12. **I. bauchiensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub up to 15 ft. high, with slender tubular white fragrant flowers in dense terminal cymes.

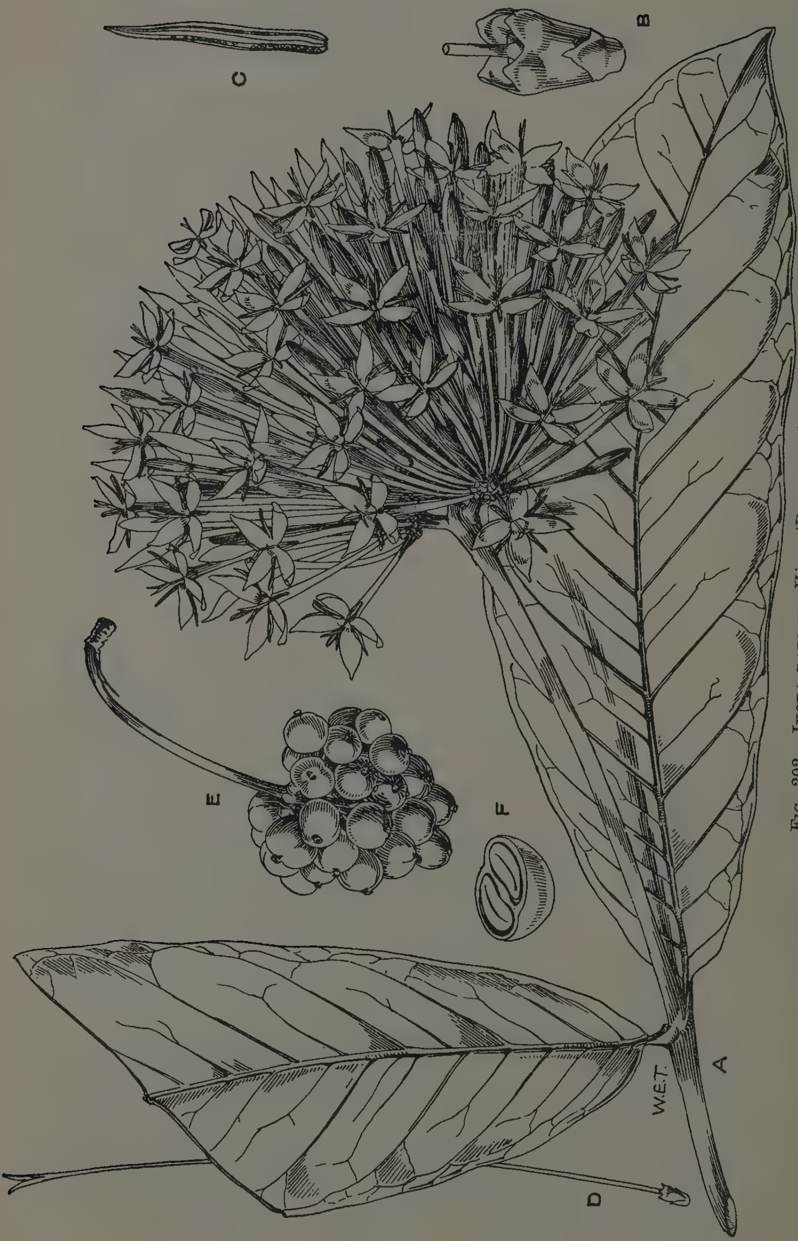

Fig. 202.—Ixora radiata *Hiern* (Rubiaceae).

A, flowering shoot. B, ovary. C, anther. D, pistil. E, fruits. F, cross-section of fruit.

N. Nigeria: Bauchi Plateau, Naraguta (Nov., Jan.)! Exsicc.—*Lely* 102; 123.

13. **I. guineensis** *Benth.*—F.T.A. 3: 165. A shrub, with white flowers ¾ in. long.
"Guinea Coast." Exsicc.—*Thonning* ?

14. **I. riparia** *Hiern*—F.T.A. 3: 164. *I. obanensis* and *I. Talbotii* Wernham. A glabrous shrub 15 ft. high, with cymes of slender white flowers ¾ in. long.
S. Nigeria: Oban! Cameroons Mt., Tiko (Jan.)! Victoria (Nov.)! Likomba Plantation (Oct.)! Fernando Po (Dec.)! Also in French Cameroons. Exsicc.—*Mann* 19. *Talb.* 230; 2038. *Dunlap* 169. *Maitland* 771. *Mildbraed* 10549; 10690.

15. **I. Thomsonii** *Hiern*—F.T.A. 3: 164. A shrub with narrow-tubular white flowers ¾ in. long.
S. Nigeria: Calabar! Exsicc.—*Thomson* 45.

16. **I. breviflora** *Hiern*—F.T.A. 3: 165. *I. carniflora* K. Krause. A shrub 15 ft. high, with white or red flowers and red berries.
Sierra Leone: Ninia, Talla Hills (fr. Feb.)! Erimakuna! Fernando Po, 1,000–3,000 ft.! Exsicc.—*Mann* 315. *Sc. Elliot* 4890; 5405; 5909. *Mildbr.* 6391.

17. **I. brachysiphon** *Hiern*—F.T.A. 3: 165. A glabrous shrub with shining leaves and white flowers in few-flowered cymes.
Sierra Leone: Bagroo R. (Mar.)! Exsicc.—*Mann* 792.

18. **I. rosea** *K. Schum.* in Engl. Bot. Jahrb. 33: 358. *I. nematopoda* K. Schum. *I. tetramera* K. Schum. ex Wernham, name only. A shrub with abruptly acuminate leaves and slender white (?) flowers ¾ in. long in lax cymes.
S. Nigeria: Oban! Victoria! Between Barombi and Ninga (June)! Fernando Po! Exsicc.—*Mann* (no number). *Talb.* 231. *Preuss* 345; 1338.

19. **I. divaricata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. A small tree about 15 ft. high, with narrow flowers in a lax terminal cyme, and bilobed berry-like fruits ¼–⅓ in. in diameter.
Liberia: Dukwia R. (Mar.)! Exsicc.—*G. P. Cooper* 307; 308.

## 25. **PAVETTA** Linn.—F.T.A. 3: 167.

Calyx-lobes longer than the ovary, linear-filiform, 0·8–1·5 cm. long:
Leaves elongate-obovate, acutely acuminate, with 12–15 pairs of lateral nerves, up to 35 cm. long and 7 cm. broad, hispid on the nerves; corolla-tube 2·5 cm. long, lobes lanceolate, 2 cm. long; style long-exserted .. .. .. 1. *hispida*
Leaves oblong-elliptic, broadly acuminate, with about 10 pairs of lateral nerves, about 18 cm. long and 8 cm. broad, pilose above and on the nerves below, minutely reticulate; calyx-lobes linear-filiform, about 1·5 cm. long, densely plumose-pilose; corolla 3 cm. long, pilose at the tip; style long-exserted .. .. 2. *plumosa*
Leaves oblong-elliptic, obtusely-pointed, 5–11 cm. long, 2·5–4 cm. broad, softly pubescent below, with about 6 pairs of lateral nerves; corolla-tube 3 cm. long, very slender, slightly pubescent, lobes 1 cm. long; style shortly-exserted 3. *apiculata*
Calyx-lobes shorter than the ovary or broad and spathulate:
Calyx-lobes overlapping, especially at the base:
Leaves pubescent below:
Flowers in a subglobose cluster; leaves not reticulate below, narrowly-elongate-obovate, acuminate, up to 30 cm. long and 8 cm. broad, with about 10 pairs of lateral nerves; petiole up to 3 cm. long; calyx-lobes obovate, 8 mm. long; style long-exserted .. .. .. .. .. .. .. 4. *genipaefolia*
Flowers in a dense corymbose cyme:
Leaves strongly reticulate below, narrowly-elliptic, 15–25 cm. long, 6–9 cm. broad, with about 12 pairs of lateral nerves; petiole 1·5 cm. long; calyx-lobes broadly ovate, 4 mm. long; style shortly exserted, pubescent .. 5. *viburnoides*
Leaves not reticulate below, broadly elliptic-obovate, 15–20 cm. long, 4·5–10 cm. broad, with 9–10 pairs of lateral nerves, softly and shortly pubescent all over the lower surface but especially on the nerves; petiole 2·5–4 cm. long, tomentellous; calyx-lobes broadly ovate, 2 mm. long, densely pubescent outside 6. *mollissima*
Leaves glabrous below or pubescent only in the axils of the nerves:
Calyx puberulous outside; leaves broadly oblong-oblanceolate, broadly acuminate, 9–15 cm. long, 2·5–5 cm. broad, with 7–9 pairs of lateral nerves; cymes many-flowered, widely corymbose; fruits depressed-globose, 8 mm. diam., nervose 7. *nitida*
Calyx glabrous outside (sometimes shortly ciliate):
Pedicels glabrous or very minutely puberulous; calyx-lobes transversely oblong; leaves as in *P. nitida*; cymes few-flowered, closely corymbose; corolla-tube 6 mm. long, lobes a little longer .. .. .. .. 8. *Staudtii*
Pedicels glabrous; calyx-lobes transversely oblong; leaves elongate-oblong-elliptic, rather abruptly acuminate, 18–25 cm. long, about 10 cm. broad; corolla-tube very short, a little longer than the calyx .. .. 9. *Mannioides*
Pedicels hirsute-pubescent; calyx-lobes rounded-ovate; leaves elliptic-oblanceolate, broadly acuminate, acute at the base, 6–12 cm. long, 2–5 cm. broad, shining, closely reticulate on both surfaces; corolla acute in bud .. 10. *nigrescens*
Calyx-lobes valvate:
*Calyx glabrous outside:
Leaves narrowly elongate-oblong-oblanceolate, rounded at the apex, 15–25 cm. long, 3–5 cm. broad, with a stout straw-coloured midrib and 5–8 pairs of arched lateral nerves; petiole very short; corymbs subsessile, many-flowered; calyx truncate, 2·5 mm. long; corolla-tube 1 cm. long; styles long-exserted, narrowly clavate .. .. .. .. .. .. .. .. 11. *crassipes*

Leaves more or less obovate or shortly and broadly oblanceolate, usually acuminate :
  Corolla-tube 1·5–2 cm. long ; exserted part of style longer than the corolla-tube :
    Leaves small, about 7–10 cm. long, bluish green when dry, elliptic, 7–10 cm. long, 3–4 cm. broad, glabrous ; petiole about 1 cm. long ; stipules shortly subulate from a broad base ; pedicels nearly 1 cm. long ; calyx with subulate teeth ; cymes subsessile.. .. .. .. .. .. .. 12. *Warneckei*
    Leaves large, about 25 cm. long, and 12 cm. broad, elliptic, cuspidate-acuminate, glabrous ; petiole 2–5 cm. long ; cymes few-flowered, lax ; calyx dentate ; corolla-tube 1·5 cm. long, lobes as long ; style very long-exserted and slender ; fruits globose, 1 cm. diam. .. .. .. .. .. 13. *neurocarpa*
  Corolla-tube up to 0·8 cm. long :
    Calyx subtruncate or undulate, leathery ; leaves broadly cuneate and unequal-sided at the base, caudate-acuminate, 15–20 cm. long, glabrous below ; lateral nerves about 9 pairs ; veins very lax ; petiole 2 cm. long ; cymes branched from the base ; corolla-lobes nearly 1 cm. long .. .. 14. *Mannii*
    Calyx lobed, lobes broadly triangular ; leaves elongate-obovate, equal-sided at the base, gradually acuminate, about 30 cm. long and 8 cm. broad, thin ; lateral nerves about 12 pairs, rather closely reticulate between ; petiole 2–4 cm. long ; cymes subsessile ; corolla-lobes about 1 cm. long .. .. 15. *bidentata*
    Calyx shortly toothed ; leaves oblanceolate, scarcely acuminate, about 5 cm. long and 2 cm. broad, thin ; lateral nerves about 6 pairs ; petiole short 16. *saxicola*

**Calyx puberulous or pubescent outside :
  Leaves not acuminate, softly pubescent, obovate-elliptic :
    Flowers subsessile in a sessile cluster ; calyx-lobes very short ; leaves 4–9 cm. long, 2·5–4·5 cm. broad ; corolla-tube 2 cm. long, sparingly puberulous, lobes 4 mm. long ; style exserted for 2 cm. ; fruit 1 cm. diam. .. .. 17. *subcana*
    Flowers rather long-pedicellate ; calyx-lobes subulate ; leaves as above ; corolla-tube 1 cm. long, puberulous ; lobes 1 cm. long ; style exserted for 1·5 cm. long 18. *mollis*
  Leaves acuminate, glabrous or nearly so :
    Corolla-tube twice as long as the lobes, about 1·8 cm. long ; leaves very black when dry, oblong-elliptic, gradually acuminate, acute to rounded at the base, 7–9 cm. long, 2–4 cm. broad, glabrous ; pedicels 3–5 mm. long .. 19. *melanophylla*
    Corolla-tube about as long as or shorter than the lobes :
      Exserted part of the style 4 cm. long ; corolla 2 cm. long ; calyx and pedicels puberulous ; cymes openly branched, long-pedunculate ; leaves oblong-elliptic, shortly acuminate, very unequal-sided at the base, about 15 cm. long and 7–8 cm. broad ; lateral nerves 9–10 pairs .. .. .. .. .. 20. *rigida*
      Exserted part of the style much shorter than above :
        Calyx truncate or shortly repand-dentate ; leaves broadly oblanceolate, gradually acuminate, 8–15 cm. long, 2·5–5 cm. broad, pubescent only in the axils of the 6–7 pairs of lateral nerves ; cymes subsessile ; corolla about 1 cm. long 21. *brachycalyx*

        Calyx distinctly or rather deeply lobed :
          Tertiary nerves not markedly parallel, laxly reticulate :
          Calyx-lobes sharply keeled, lanceolate, 3–4 mm. long, puberulous ; leaves obovate to oblanceolate, acuminate, acute at the base, 15–20 cm. long, 4·5–8 cm. broad, thin, glabrous ; petiole up to 4 cm. long ; cymes branched from the base, many-flowered .. .. .. .. 22. *glaucescens*
          Calyx-lobes not keeled :
          Calyx-lobes rounded at the apex, broad ; leaves oblanceolate, broadly acuminate, 8–10 cm. long, 3–4 cm. broad, with tufts of hairs in the axils of the 10–12 pairs of lateral nerves ; cymes small and leafy .. 23. *Hookeriana*
          Calyx-lobes more or less acute :
          Calyx-lobes acuminate ; leaves oblong, broadly acuminate, very unequal-sided at the base, 10–15 cm. long, 3–5 cm. broad, becoming blackish when dry, with about 8 pairs of looped lateral nerves ; petiole 1 cm. long ; corolla-tube 0·5 cm. long ; fruit globose, 0·8 cm. diam., closely nerved 24. *striatula*
          Calyx-lobes broadly triangular, not acuminate, pubescent outside ; leaves oblong, gradually acuminate, shortly cuneate at the base, 12–15 cm. long, 4–6 cm. broad, minutely hairy in the axils of the 7–9 pairs of lateral nerves ; petiole up to 2 cm. long ; corolla-tube 0·5 cm. long .. 25. *Smythei*
          Tertiary nerves numerous and closely parallel, conspicuous ; leaves oblong to obovate, acute at both ends, 10–15 cm. long, 3·5–7 cm. broad, with about 8 pairs of lateral nerves ; cymes sessile, dense-flowered, finely puberulous all over ; calyx-lobes broadly ovate ; corolla-tube shorter than the lobes ; fruit not ribbed 26. *flaviflora*

1. **Pavetta hispida** *Hiern*—F.T.A. 3 : 175. A shrub, coarsely brown-hispid on all parts, with rather long leaves and white 4-partite flowers 1½ in. long in terminal branched cymes.

S. Nigeria : Oban ! Fernando Po ! Extends to Portuguese Congo. Exsicc.—*Mann* 227. *Talb*. 1490.

2. **P. plumosa** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Shrub about 3 ft. high, with a terminal ball-like cluster of white flowers.

S. Nigeria : Likomba, rain forest (Dec.) ! Exsicc.—*Mildbr*. 10743.

3. **P. apiculata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with soft foliage and lax paniculate cymes of very slender white flowers 1½–2 in. long.

French Guinea : Kouroussa (July) ! Gold Coast : Okroase (May) ! Achimota (Apr.) ! Exsicc.—*Pobéguin* 274. *Johnson* 754. *Irvine* 330.

4. **P. genipaefolia** *Schum.*—F.T.A. 3 : 175. *P. megistocalyx* K. Krause. A shrub, hispid-pubescent, with 4-merous white flowers 1 in. or less long crowded in dense clusters, the corolla-lobes often dark veined.

Sierra Leone : near top of Sugar Loaf (Dec.) ! Freetown (May) ! Gold Coast : Aburi Hills (May) ! Mampong (May) ! Kwahu Hills (Apr.) ! Togo : Fodoe (May) ! Misahohe ! Exsicc.—*Barter* (no number). *Sc. Elliot* 4024. *Johnson* 131 ; 905. *Farmar* 431. *Vigne* 1129. *Baumann* 278. *Mildbr*. 7282. *Busse* 3424.

5. **P. viburnoides** *A. Chev.* Bot. 334. A shrub 8–15 ft. high, pale brownish-pubescent, with white flowers ⅓ in. long numerous in terminal corymbose cymes.

French Sudan : Moussaia ! French Guinea : Kollangui (Mar.) ! Futa-Jallon, Labe, Timbo, Kankan ! Sierra Leone : near Falaba (Mar.) ! Also in Cameroons. Exsicc.—*Chev*. 403 ; 12193, etc. *Sc. Elliot* 5142. *Farmar* 232. (See Appendix).

6. **P. mollissima** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with fairly broad leaves pale and shortly soft-pubescent beneath, and white flowers ⅓ in. long abundant in dense branched cymes.

Gold Coast : Kwahu Prasu (Feb.) ! Exsicc.—*Vigne* 1601.

7. **P. nitida** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Ixora nitida* Schum. & Thonn. *P. Baconia* Hiern—F.T.A. 3 : 176; Chev. Bot. 333. *Baconia corymbosa* DC. (not *Pavetta corymbosa* Houtt). A shrub or small low-branching tree with shining foliage and copious corymbs of white flowers ⅓ in. long.

Widely distributed from Senegal and French Sudan to Cameroons, Fernando Po, Angola and E. Africa. Exsicc.—*Heudelot* 62 ; 673 ; 772. *T. Vogel* 33 ; 82 ; 180. *Barter* 1257 ; 2200 ; 3402. *Mann* 195. *Irving* 140. *Millen* 156 ; 209. *Sc. Elliot* 3947 ; 4377a ; 5093 ; 5129 ; 5506. *Johnson* 899. *Chev*. 23194. *Warnecke* 49. (See Appendix).

8. **P. Staudtii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A nearly glabrous shrub, puberulous on the inflorescence, with white flowers ½ in. long.

S. Nigeria : Johann-Albrechtshöhe ! Exsicc.—*Staudt* 599.

9. **P. Mannioides** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A glabrous shrub with large leaves and broad pale lateral nerves.

S. Nigeria : Oban ! Exsicc.—*Talb*. (no number).

10. **P. nigrescens** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with shining foliage turning blackish in drying and rather small white flowers numerous in branched terminal cymes.

Sierra Leone : Kennema (Jan.) ! Exsicc.—*N. W. Thomas* 7500: 7527 ; 7536 ; 7834.

11. **P. crassipes** *K. Schum.* in Engl. Pflanzenw. Ost. Afr. C. 388. *P. Barteri* Dawe. *P. utilis* Hua ; Chev. Bot. 334. A low glabrous shrub of the savannah, with stout subquadrangular branches covered with pale corky bark splitting and falling off, and corymbs of narrow greenish-white flowers ¾ in. long.

French Sudan : Bongouni (Apr.) ! Kéméné (Mar.) ; Mossi (Aug.). Senegal : Casamance, Koulayé (Feb.). Gold Coast : N. Terr., several localities (Mar.–May) ! Dahomey : Mts. Atacora, 1,200 ft., Somba country. N. Nigeria : several localities (Feb.–May, fr. June) ! S. Nigeria : Abo ! Extends to Upper Ubangi, Rhodesia and E. Africa. Exsicc.—*Barter* 324. *Elliott* 194. *Dalz*. 42 ; 217. *Shaw* 43. *Lely* 829. *Kitson* 739 ; 963. *Chev*. 684. (See Appendix).

12. **P. Warneckei** *K. Schum. & Krause* in Engl. Bot. Jahrb. 39 : 551. A glabrous shrub with white flowers ¾ in. long numerous in terminal cymes, the flowers and leaves turning dark in drying ; fruits black, ¼ in. in diameter.

Gold Coast : Accra Plains ! Togo : Lome (fl. and fr. May) ! Exsicc.—*Warnecke* 301. *Irvine* 251.

13. **P. neurocarpa** *Benth.*—F.T.A. 3 : 172. *P. macrostemon* K. Schum. A glabrous shrub with rather large leaves and white flowers 1 in. long in loose branched cymes ; fruits obscurely ribbed, ⅓ in. in diameter.

Cameroons Mt. ! Fernando Po (Nov.) ! Exsicc.—*T. Vogel* 151. *Kalbreyer* 171.

14. **P. Mannii** *Hiern*—F.T.A. 3 : 169. A glabrous shrub with fairly large leaves and white flowers 3 in. long in loose ample cymes.

S. Nigeria : Oban ! Cameroons R. (Dec.) ! Exsicc.—*Mann* (no number). *Talb*. (no number).

15. **P. bidentata** *Hiern*—F.T.A. 3 : 170. *P. Deistelii* K. Schum. A shrub with rather long pale green shining leaves and white flowers ½–¾ in. long numerous in terminal cymes.

Cameroons Mt. : Victoria (Jan.) ! Fernando Po (Apr.) ! Also in Cameroons. Exsicc.—*Mann* 395. *Deistel* 127.

16. **P. saxicola** *K. Krause* in Engl. Bot. Jahrb. 48 : 421.

Togo ! Exsicc.—*Kersting* 613.

17. **P. subcana** *Hiern*—F.T.A. 3 : 172. A more or less scrambling shrub pubescent on the young parts, with whitish branches and slender white flowers about 1 in. long crowded in clusters on short lateral branchlets, flowers and leaves turning black in drying.

N. Nigeria : Malabu Hills, Yola Prov. (May) ! Also in E. Sudan, Somaliland and Tanganyika. Exsicc.—*Dalz*. 40.

18. **P. mollis** *Afzel. ex Hiern*—F.T.A. 3 : 174.

Gold Coast : Cape Coast. Achimota ! Exsicc.—*Brass*. *Irvine* 330 ; 756.

19. **P. melanophylla** *K. Schum.* in Engl. Bot. Jahrb. 28 : 85. A nearly glabrous more or less scrambling shrub with wiry branches and narrow white flowers about 1 in. long numerous in terminal branched cymes, the leaves turning black in drying.

S. Nigeria : Lagos, Ikoyi (Dec., Feb.) ! Also in Cameroons. Exsicc.—*Dalz*. 1203 ; 1375.

20. **P. rigida** *Hiern*—F.T.A. 3 : 178. A nearly glabrous shrub with pale stems and foliage, and white flowers ¾ in. long in a wide-branching terminal cyme.

Fernando Po (Jan.) ! Exsicc.—*Mann* 183.

21. **P. brachycalyx** *Hiern*—F.T.A. 3 : 169. A nearly glabrous more or less scrambling shrub with pale leaves and white flowers ⅓ in. long numerous in rather dense terminal branched cymes.

Cameroons Mt., 2,000–3,000 ft. (Dec.) ! Fernando Po ! Also in French Cameroons. Exsicc.—*Mann* 2159. *Mildbr*. 6341. *Deistel* 134. *Kalbreyer* 171.

22. **P. glaucescens** *Hiern*—F.T.A. 3 : 171. A nearly glabrous shrub with pale shining foliage and white flowers ½–⅔ in. long numerous in terminal branched cymes.

S. Nigeria : Eket ! Oban ! Calabar ! Fernando Po ! Exsicc.—*Mann* (no number). *Thomson* 68.

23. **P. Hookeriana** *Hiern*—F.T.A. 3 : 176. A shrub with glabrous branchlets, shining leaves and white flowers ⅓ in. long in rather small close cymes.

Cameroons Mt., 7,000 ft. (Dec.) ! Exsicc.—*Mann* 2166. *Maitland* 992.

24. **P. striatula** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A nearly glabrous climbing shrub with greenish-white flowers ½–¾ in. long in lax terminal branched cymes ; turning more or less blackish in drying.

Sierra Leone : Jigaya (fr. Sept.) ! Bumbuna (fr. Oct.) ! Mabonto (fr. Oct.) ! Exsicc.—*N. W. Thomas* 2760 ; 3546 ; 3657 ; 3675.

25. **P. Smythei** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A more or less scrambling shrub with glabrous branchlets and white flowers about ½ in. long numerous in branched cymes.
Sierra Leone : Sugar Loaf ! Fundu (Jan.) ! ? locality, common ! Ronietta (fr. Nov.) ! Bumbuna (fr. Oct.) ! Exsicc.—*Smythe* 214 ; 256. *Sc. Elliot* 3960. *N. W. Thomas* 3439 ; 5514.

26. **P. flaviflora** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Execostylus flaviflorus* K. Schum. A shrub or small tree, subglabrous, with fairly large leaves and white flowers like those of *P. nitida*.
S. Nigeria : Benin district, Iddu (Mar.) ! Oban ! Cameroons Mt. : Victoria (Dec.) ! Above Victoria, 1,600 ft. (Mar.) ! Buea (Jan.) ! Exsicc.—*Dunlap* 20. *Farquhar* 32. *Talb.* (no number). *Maitland* 213 ; 908. *Kalbreyer* 92.

*Imperfectly known species.*

**P. owariensis** *P. de Beauv.* Fl. Owar. & Benin 1 : 87, t. 52.
S. Nigeria : Oware.—Exsicc.—*P. de Beauvois* (not found in Paris Herbarium).

## 26. PSILANTHUS Hook. f.—F.T.A. 3 : 185.

Anthers partly exserted from the corolla-tube :

Corolla-lobes lanceolate-elliptic, 2·5 cm. long ; leaves oblong-elliptic, bluntly acuminate, 8–15 cm. long, 3–7 cm. broad, glabrous, with 4–6 pairs of lateral nerves ; petiole about 0·5–1 cm. long ; flowers subsolitary, subsessile ; calyx with small triangular teeth ; corolla-tube slender, 4 cm. long ; calyx-lobes elongated up to 3 cm. long in fruit .. .. .. .. .. .. .. .. 1. *Mannii*

Corolla-lobes broadly oblong, rounded-truncate at the apex, less than 1 cm. long ; leaves narrowly obovate, broadly acuminate, 5–13 cm. long, 2·5–4 cm. broad, glabrous except in the axils of the 5–6 pairs of lateral nerves ; flowers terminal, solitary, sessile ; calyx truncate ; corolla-tube 3 cm. long .. 2. *jasminoides*

Anthers included in the corolla-tube ; calyx-lobes not enlarging in fruit ; leaves elliptic, broadly linear-acuminate, cuneate at the base, 5–11 cm. long, 3–5 cm. broad, glabrous, with 3–4 pairs of looped lateral nerves ; petiole short ; flowers solitary or subsolitary, sessile ; calyx truncate ; corolla-tube 1·5 cm. long, lobes broadly linear, 1·3 cm. long ; fruit black when dry, fleshy, about 1 cm. diam. .. .. .. 3. *ebracteolatus*

1. **P. Mannii** *Hook. f.*—F.T.A. 3 : 186. *Heinsia jasminiflora* A. Chev. Bot. 317, not of DC. A shrub or small tree with slender tubular white flowers up to 2½ in. long and 2 in. across when open, and yellow ribbed fruit turning blackish, ¾ in. long, crowned by the elongated calyx.
French Guinea : Kaba Valley ! Faranna ! Sierra Leone : Pujehun (Apr.) ! Yonibana (fr. Oct., Nov.) ! Ivory Coast : various localities ! Gold Coast : Akwapim (fr. Apr.) ! S. Nigeria : Oshogbo ! Oban ! Fernando Po : on the beach ! Extends south to Purtuguese Congo. Exsicc.—*Mann* 266. *Millson. Lane-Poole* 67. *Irvine* 1152. *Chev.* 13245 ; 13401 ; 13431 ; 16420, etc. (see Chev. l.c.).

2. **P. jasminoides** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with white tubular flowers 1½ in. long, ½–¾ in. wide when open, solitary on abbreviated axillary branchlets.
Gold Coast : near Larte (Jan.) ! Exsicc.—*Johnson* (no number).

3. **P. ebracteolatus** *Hiern*—F.T.A. 3 : 186. *P. tetramerus* Hiern. A glabrous shrub 6–8 ft. high or a scrambling undershrub, with slender white tubular flowers 1–1½ in. long, 1 in. across when open.
Sierra Leone : various localities ! Liberia : Peahtah (Oct.) ! Gold Coast : Amentia Ashanti ! S. Nigeria : Lagos Colony ! Idanre ! Oloke Meji ! Ambas Bay (Jan.) ! Johann-Albrechtshöhe ! Exsicc.—*Afzelius. Mann* 740 ; 846. *Millson. Sc. Elliot* 5028 ; 5065 ; 5382 ; 5891. *Smythe* 130. *Foster* 199 ; 275 ; 282. *Linder* 1018. *Staudt* 562. *Irvine* 456.

## 27. RUTIDEA DC.—F.T.A. 3 : 187.

Corolla-tube glabrous outside :

Branchlets glabrous ; stipules undivided :

Corolla-tube less than 5 mm. long ; leaves broadly elliptic to obovate, abruptly acuminate, very shortly cuneate at the base, 10–16 cm. long, 5–10 cm. broad, with 6–8 pairs of lateral nerves, glabrous ; petiole up to 4 cm. long ; bracts subulate-lanceolate, ciliate ; fruits globose, 8 mm. diam., reticulate when dry 1. *decorticata*

Corolla-tube 1 cm. long, very slender ; stigma large and ellipsoid ; leaves oblong-lanceolate, gradually acuminate, about 11 cm. long and 3–5 cm. broad, with about 6 pairs of spreading lateral nerves ; petiole short ; bracts linear, shortly pubescent 2. *glabra*

Branchlets bristly-pubescent ; stipules divided :

Calyx-lobes ovate ; stipules pectinately divided in 3–5 segments ; leaves elliptic or ovate-elliptic, shortly and acutely acuminate, subcordate at the base, 6–10 cm. long, 3–5·5 cm. broad, with 4–5 pairs of looped prominent nerves, setose-pubescent on the nerves and in their axils ; flowers crowded in panicles ; fruits reticulate 3. *parviflora*

Calyx-lobes subulate ; stipules pectinately divided into 5–7 linear segments ; leaves elliptic, long-mucronate-acuminate or gradually so, rounded at the base, 8–14 cm. long, 4–6 cm. broad, pilose on the 3–4 pairs of looped prominent nerves and densely setose-pilose in their axils ; flowers in small paniculate heads ; bracts linear-subulate, about 1 cm. long ; fruits globose, about 6 mm. diam., shining 4. *rufipilis*

Corolla-tube and lobes pubescent outside ; stipules undivided :

Leaves minutely pubescent on the nerves below, ovate-elliptic, acutely acuminate, more or less rounded at the base, 10–15 cm. long, 5–7 cm. broad, with 9–10 pairs of spreading lateral nerves ; petiole 1–1·5 cm. long ; stipules linear-subulate from a broad triangular base, nearly 1 cm. long ; corolla-tube about 4 mm. long ; anthers conspicuous, exserted ; style narrowly club-shaped, pubescent towards the mouth of corolla .. .. .. .. .. .. .. .. 5. *Smithii*

Leaves long-pilose on the nerves below, elliptic or ovate, acutely mucronate, subcordate at the base, 9–14 cm. long, 4–7 cm. broad, with 6–10 pairs of prominent lateral nerves; petiole up to 5 mm. long; stipules subulate, about 1 cm. long; corolla-tube 1 cm. long; anthers subexserted; exserted part of style glabrous; fruits surrounded by the persistent bracts .. .. .. .. 6. *pavettoides*

Leaves more or less tomentose all over the lower surface, densely so in the axils of the 6–8 pairs of lateral nerves, elliptic, rounded at the base, 7–15 cm. long, 4–8 cm. broad; petiole about 1 cm. long, tomentose; flowers small, in pyramidal much-branched tomentose panicles; corolla-tube 4–5 mm. long; style very slender, slightly pubescent at the mouth of the corolla; fruit globose, finely reticulate, 8 mm. diam., glabrous .. .. .. .. .. .. 7. *olenotricha*

1. **Rutidea decorticata** *Hiern*—F.T.A. 3 : 190. *R. landolphioides* Wernham. A climbing shrub with rather small flowers ¼ in. long in divaricately branched panicles 2–3 in. long.
S. Nigeria: Degema! Oban! Cameroons Mt., 2,000–3,000 ft. (fl. and fr. Dec.)! Also in French Cameroons. Exsicc.—*Mann* 2157. *Talb.* 3829.

2. **R. glabra** *Hiern*—F.T.A. 3 : 190. *R. membranacea* Hiern. *Pavetta brachycoryne* K. Schum. A climbing shrub or a small tree with slender tubular white flowers ½ in. long, numerous in dense terminal corymbs, sometimes turning more or less black in drying.
Gold Coast: Axim! Kwahu (Apr.)! ? locality! S. Nigeria: Calabar! Oban! Victoria to Bimbia (Mar.). Barombi and environs (Feb.)! Johann-Albrechtshöhe (Feb.). Cameroons Mt.: Buea, 2,500 ft.! Also in Gabon. Exsicc.—*Thomson* 107; 126. *Burton & Cameron.* *Johnson* 650. *Irvine* 382. *Talb.* 1573. *Preuss* 37. *Maitland* 556.

3. **R. parviflora** *DC.*—F.T.A. 3 : 188; Stapf 613; Chev. Bot. 337. *R. Kerstingii* K. Krause. A hairy climbing shrub with abundant white fragrant flowers ⅓ in. long in panicles, and red wrinkled berries with a fibrous inner layer.
French Sudan: Bambanatoumba. Senegal! Futa-Jallon, between the Konkouré and Timbo (Mar.)! Kindia! Kankan to Kouroussa! Sierra Leone and Liberia: common! Ivory Coast: Attié, Montezo; Tepo country, Grabo. Gold Coast: Kumasi (Mar.)! Assin Yan Kumasi! Essiama (fr. Oct.)! N. Nigeria: Nupe! S. Nigeria: Lagos Colony! Exsicc.—*Leprieur & Perrottet.* *Whitfield.* *T. Vogel* 26; 39. *Barter* (no number). *Sc. Elliot* 4945; 5808. *Rowland.* *Cummins* 116; 241. *Whyte.* *Kersting* A. 55.

4. **R. rufipilis** *Hiern*—F.T.A. 3 : 188. Habit of the last.
S. Nigeria: Lagos! Eket! Oban! Calabar (fl. and fr. Feb.)! Exsicc.—*Mann* 2295. *Moloney* 7.

5. **R. Smithii** *Hiern*—F.T.A. 3 : 189; Stapf 613. *R. albiflora* K. Schum. A climbing shrub, more or less pubescent, with sickly-scented whitish flowers ¼–⅓ in. long in pyramidal often dense panicles.
Sierra Leone: common! Liberia: Kakatown! Firestone Plantation No. 3 (fr. Aug.)! Gold Coast: New Jauben (Mar.)! S. Nigeria: Lagos! Epe (Feb.)! Lagos Colony! Ikorodu (Mar.)! Degema! Oban! Johann Albrechtshöhe! Also in Congo Basin and Angola. Exsicc.—*Moloney!* *Sc. Elliot* 4075; 5003. *Rowland.* *Millen* 157. *Johnson* 629. *Whyte.* *Talb.* 3816. *Linder* 280. *Schlechter* 12298. *Staudt* 786.

6. **R. pavettoides** *Wernham* in Journ. Bot. 1919 : 345. A densely-hairy climbing shrub with narrow white fragrant flowers ½–¾ in. long crowded in dense cymes.
S. Nigeria: Lagos, Ikoyi (Dec.)! Oban! Also in Cameroons. Exsicc.—*Dalz.* 1201. *Talb.* (no number).

7. **R. olenotricha** *Hiern*—F.T.A. 3 : 189; Chev. Bot. 337, partly. A climbing shrub, rusty-tomentose, with rather small white flowers ¼ in. long, crowded in pyramidal panicles leafy at the base.
Sierra Leone: Heddle's Farm (May)! Leicester (May)! Kennema (fr. Jan.)! Ivory Coast: between Soubiré and Yaou! Gold Coast: Aburi (May)! Abetifi (June)! Also in Cameroons and Angola, and extending to E. Sudan. Exsicc.—*Sc. Elliot* 3929. *Brown* 325. *Lane-Poole* 281. *N. W. Thomas* 980. *Chev.* 17803.

## 28. **COFFEA** Linn.—F.T.A. 3 : 179. See also Froehner in Notizbl. Bot. Gart. Berl. 1 : 230 (1897).

*Tall shrubs or small trees; leaves never long-attenuated to the base, or if so then relatively short:

Leaves subcordate-rounded at the base, elliptic, broadly caudate-acuminate, 5–8 cm. long, 2·5–3·5 cm. broad, pubescent on the 5–6 pairs of lateral nerves and in their axils below; petiole densely strigose; flowers axillary, 1–few together, subtended by small bracteate leaves; calyx minute, shortly 5-lobed; corolla-tube 2 cm. long, lobes 1 cm. long; anthers wholly exserted, 6 mm. long .. .. 1. *subcordata*

Leaves not subcordate (usually acute) at the base (rarely subcordate and then bracts scarious):

Anthers only partly exserted from the corolla-tube; leaves deciduous:

Bracteoles more or less free, not united into truncate cupular involucres; anthers not transversely locellate:

Flowers subtended by rigid dry bracts with sharp setose points; leaves deciduous, elliptic, rounded to slightly narrowed at the base, broadly acuminate, acute, 4–6 cm. long, 2–3 cm. broad, thin, pubescent on the nerves below; calyx very small; corolla-tube 2·5 cm. long, lobes 1 cm. long; berry sessile, globose, 1 cm. diam. .. .. .. .. .. .. .. .. 2. *jasminoides*

Flowers subtended by soft often rather leafy bracts, mostly precocious but sometimes appearing after the leaves and then smaller; leaves glabrous or puberulous when young, mature broadly elliptic to obovate, broadly acuminate, about 10 cm. long and 5 cm. broad, with 4–5 pairs of lateral nerves; bracts around the flower variably developed, leafy and simulating the calyx, the latter minute and more or less truncate; corolla-tube slender to fairly stout, 1·5–4 cm. long, lobes 5–7; fruits globose, about 1 cm. diam. .. .. 3. *rupestris*

Bracteoles united into superimposed cupular truncate involucres; anthers subtransversely locellate (when cells dehiscent appearing as undulate compartments) 4. *macrochlamys*

Anthers wholly exserted from the corolla-tube :

Bracteoles linear-lanceolate, gradually very pungent-pointed, about 1 cm. long; leaves narrowly obovate to obovate-elliptic, acuminate, rather long-cuneate at the base, 15–20 cm. long, 4–7·5 cm. broad, glabrous, with about 10 pairs of lateral nerves prominent on both surfaces; stipules rather gradually cuspidate; corolla-tube 8 mm. long, lobes 1 cm. long; berry ellipsoid, subacute, 1·5 cm. long .. .. .. .. .. .. .. .. .. 5. *brevipes*

Bracteoles not pungent-pointed, usually foliaceous :

Flowers 1–2 together, each surrounded by a whorl of large foliaceous bracts resembling a calyx, about 8 mm. long; leaves obovate-elliptic, broadly acuminate, shortly acute at the base, 7–10 cm. long, 3–4·5 cm. broad, pitted but glabrous in the axils of the 4–5 pairs of lateral nerves; petiole 5 mm. long; bark of the branchlets flaky and soon falling off; corolla-tube 1·5 cm. long, lobes as long .. .. .. .. .. .. .. 6. *ligustrifolia*

Flowers not surrounded by a whorl of foliaceous bracts, though the latter sometimes foliaceous :

Leaves narrowly oblong-oblanceolate, long- and gradually or subabruptly-acuminate, 6–12 cm. long, 1–4 cm. broad, pitted but glabrous in the axils of the 6–8 pairs of lateral nerves; flowers at most about 3 in each leaf-axil; calyx truncate; corolla-tube 5 mm. long, lobes about 1·5 cm. long; fruit broadly ellipsoid, 1·5 cm. long .. .. .. .. 7. *stenophylla*

Leaves much broader than above, elliptic to broadly obovate; flowers numerous or few in each leaf-axil :

Corolla 5-lobed :

Leaves relatively small, averaging about 12–15 cm. long and about 6 cm. broad, long-acuminate, shortly acute at the base, with 9–12 pairs of lateral nerves; flowers several in each leaf-axil; corolla-tube nearly as long as the lobes; berry oblong-ellipsoid, about 1·5 cm. long 8. *arabica*

Leaves much larger, well over 15 cm. long and 10 cm. or more broad :

Flowers without or with very small leafy bracts amongst them, few (3–5) in each leaf-axil; leaves broadly cuneate at the base; corolla-tube much shorter than the lobes; fruits very broadly ellipsoid, about 1·3 cm. long, striate when dry .. .. .. .. .. 9. *Maclaudii*

Flowers with leafy bracts amongst them, numerous in each leaf-axil; leaves more or less rounded at the base; corolla-tube not much shorter than the lobes (cultivated) .. .. .. .. 10. *robusta*

Corolla 6–8-lobed; leaves large, at most shortly and broadly pointed; flowers few in each leaf-axil :

Lateral nerves of leaves about 6 pairs; blade sharply cuneate at the base, narrowly obovate, 15–20 cm. long, 7–8 cm. broad, pitted in the axils of the nerves; corolla about 2 cm. long; fruit 1·5–2 cm. long 11. *Abeokutae*

Lateral nerves of leaves 7–10 pairs; blade broadly cuneate at the base, broadly elliptic-obovate, about 20 cm. long and 10 cm. broad, shortly and broadly pointed, pitted in the axils of the nerves; corolla about 3·5 cm. long; fruits about 2·5 cm. long, wrinkled when dry .. .. 12. *liberica*

**Dwarf shrublet; leaves long-attenuated to the rounded base and subsessile, elongate-oblong-obovate, acuminate, about 30 cm. long and 5–10 cm. broad, not pitted in the axils of the 10–15 pairs of lateral nerves; fruits about 2 cm. long 13. *humilis*

1. **Coffea subcordata** *Hiern*—F.T.A. 3 : 184. A scrambling shrub with loosely rusty-pubescent branchlets and white fragrant flowers about 1 in. long in the axils of the leaves; berry red.

S. Nigeria : Calabar (Mar.) ! Eket ! Oban ! Also in Cameroons. Exsicc.—*Thomson* 35. *Talb.* 1523.

2. **C. jasminoides** *Welw.*—F.T.A. 3 : 185. A scrambling shrub, pubescent on the young shoots, with fragrant flowers on bracteate lateral shoots, white, red on the outside, 1–1½ in. long; berry white; flowering when leafless.

French Guinea : ? locality ! Sierra Leone : Mofari (Jan.) ! Sendugu (fr. June) ! S. Nigeria : Onitsha ! Awka ! Eket ! Calabar ! Extends to Angola. Exsicc.—*Barter* 1249. *Thomson* 37. *Sc. Elliot* 4443. *Farmar* 252. *Smythe* 35. *N. W. Thomas* 16. *Talb.* 3171. (See Appendix).

3. **C. rupestris** *Hiern*—F.T.A. 3 : 184; Chev. Bot. 337. *C. divaricata* K. Schum.—Chev. Bot. 335. *C. nudiflora* Stapf 613; Chev. Bot. 337. *C. nudicaulis* A. Chev. Bot. 336. A straggling undershrub with stiff wiry branches, white fragrant narrow flowers 1–2 in. long generally before the leaves, and yellow berries turning red.

French Sudan : Kerfomouria ! Liberia : Monrovia ! Sino Basin ! Ivory Coast : forest between Middle Sassandra and Middle Cavally ! Dyola country, Ganhoué to Bampleu (Apr.) ! Summit of Mt. Kouan (Apr.) ! Gold Coast : Axim, Bou (Nov.) ! Akroful (Nov.) ! Kintampo (Mar.) ! Afram Plains (fl. and fr. May) ! Kpong (Feb.) ! Togo : Kpedsu (Jan.) ! Lome ! Agome ! Misahöhe. Dahomey : between Lake Azri and Zagnanado (Feb.) ! S. Nigeria : Abeokuta ! Ogbomosho ! Asamara, Benin (fr. Apr.) ! Ode Ossi ! Oub ! Exsicc.—*Barter* 3343. *Rowland. Johnson* 964. *Farmar* 460. *Whyte. Chev.* 19262; 21255; 23053. *Warnecke* 89. *Schlechter* 12963. *Vigne* 1832.

4. **C. macrochlamys** *K. Schum.* in Engl. Bot. Jahrb. 23 : 462. A glabrous shrub with fairly large leaves, having the habit of *C. liberica* but with flowers with a much larger calyx and bract-involucre.

Gold Coast : ? locality ! Also in Cameroons. Exsicc.—*Bunting* 9 (partly).

5. **C. brevipes** *Hiern*—F.T.A. 3 : 182. *C. Staudtii* Froehner. A glabrous shrub a few feet high with white flowers ¾ in. long solitary or few in the axils.

S. Nigeria : Johann-Albrechtshöhe ! Cameroons Mt., 2,000–3,000 ft. (Dec.) ! Exsicc.—*Mann* 2158. *Staudt* 548.

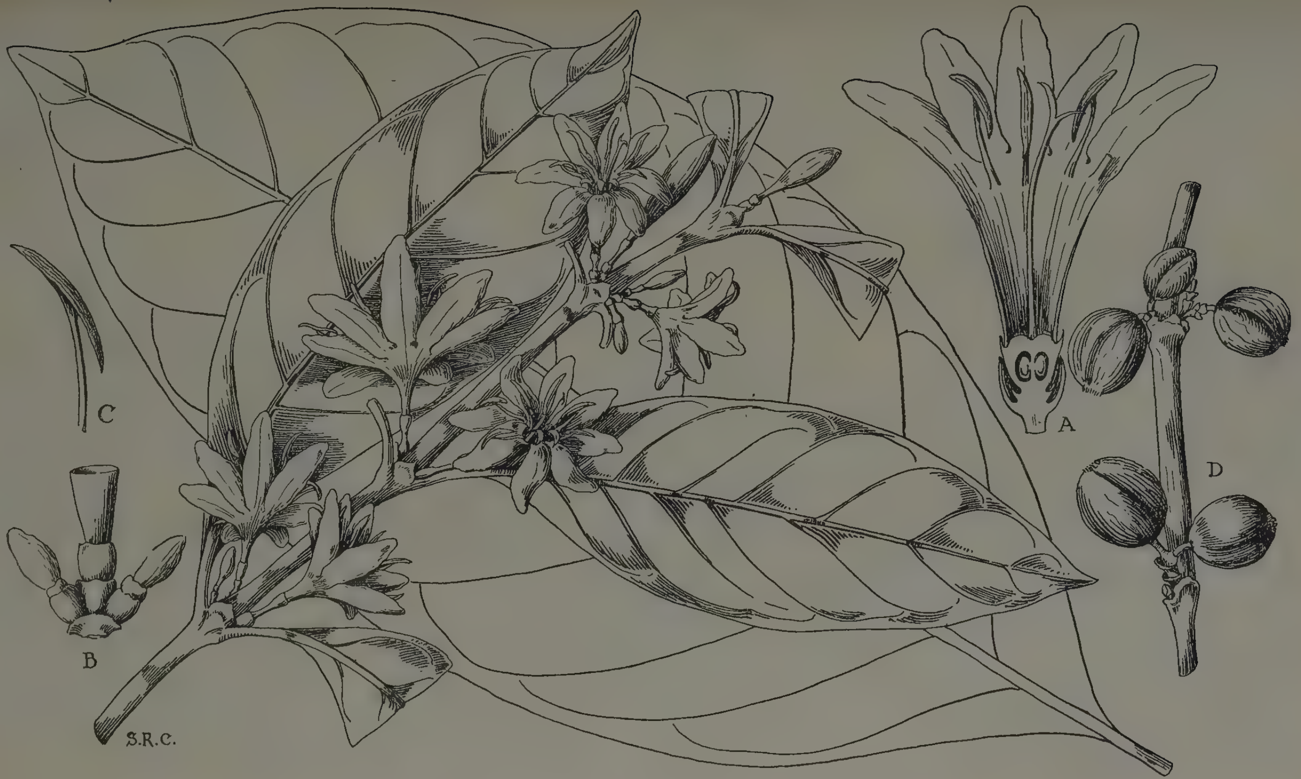

FIG. 203.—COFFEA LIBERICA *Bull ex Hiern* (RUBIACEAE).
A, longitudinal section of flower. B, part of cymule. C, stamen. D, fruits.

6. **C. ligustrifolia** *Stapf* in Journ. Linn. Soc. 37 : 109 ; Stapf 613. A straggling or climbing shrub with slender but stiff branchlets and sweet-scented white axillary flowers 1–1¼ in. long.
Sierra Leone : Victoria ! Zimmi (Nov.) ! Liberia : Sino Basin ! Kakatown ! Gold Coast : Axim, Bou (Nov.) ! Exsicc.—*Whyte. N. W. Thomas* 9059 ; 9062. *Deighton* 365. *Vigne* 1587.

7. **C. stenophylla** *G. Don*—F.T.A. 3 : 182 ; Holl. 3 : 367 ; Chev. Bot. 337. A glabrous shrub or small tree with comparatively small and narrow shining leaves and white flowers ¾–1 in. long, few in the axils.
French Guinea : Farana ! Kissidongou ! Also cultivated in various places ! Sierra Leone : " bush or wild coffee," Kessewe Hills (Apr.) ! and other localities. Ivory Coast : Bingerville ! Gold Coast : Aburi (cultivated, from Sierra Leone) ! Exsicc.—*Barter* (no number). *Morson. Sc. Elliot* 3909. *Aylmer* 125. *Johnson* 611. (See Appendix).

8. **C. arabica** *Linn.*—F.T.A. 3 : 180 ; Holl. 3 : 361 ; Chev. Bot. 335. A native of Arabia and N.E. Tropical Africa ; the common coffee of cultivation.

9. **C. Maclaudii** *A. Chev.* in Compt. Rend. Acad. Sci. Par. 140 : 1474 ; Bot. 336. A glabrous shrub with comparatively large and broad leaves and white flowers ¾ in. long, sessile, few in the axils.
French Guinea : Futa-Jallon, Mt. Bilima (May) ! Bilima-Kanté (Apr.). Labé (Apr.) ! Ivory Coast : Middle Comoé, Assikasso (Dec.) ! Exsicc.—*Chev.* 12330 ; 12332 ; 14893 ; 22590. (See Appendix).

10. **C. robusta** *Linden*, Cat. Pl. Econ. 64 ; De Wildem. Miss E. Laurent. 1 : 328 ; Holl. 3 : 366. A small tree, glabrous, with fairly large broad leaves and white flowers ¾ in. long clustered in the axils.
A native of the Congo Basin, widely cultivated.

11. **C. Abeokutae** *Cramer* Meded. Dep. Landb. Ned. Ind. No. 11, pt. 15 : 425 ; Chev. Bot. 334, partly. A glabrous shrub or tree with fairly large leaves and white flowers 1 in. long in the axils.
Sierra Leone ! Ivory Coast : Middle Sassandra, Guidéko ! Middle Comoé, Assikasso ! Exsicc.—*Lane-Poole* 128. *Chev.* 16406 bis.

12. **C. liberica** *Bull ex Hiern*—F.T.A. 3 : 181 ; Trans. Linn. Soc. ser. ii., 1 : 171, t. 24 ; Stapf 613 : Holl. 3 : 364 ; Chev. Bot. 336. *C. Abeokutae* A. Chev. Bot. 334, partly. A glabrous shrub or tree with rather large shining leaves, white axillary flowers 1–1¾ in. long, and fruits ¾–1 in. long.
According to T. Vogel indigenous around Monrovia ; cultivated from Senegal to Angola. Exsicc.—*T. Vogel* 63. *Millen* 192. *Chev.* 22588.

13. **C. humilis** *A. Chev.* in Compt. Rend. Acad. Sci. Par. 145 : 349 ; Chev. Bot. 335. A forest undershrub with long rather narrow leaves and red berries ¾–1 in. long.
Liberia : Dukwia R. (fr. Oct.–Nov.) ! Gbanga (fr. Sept.). Ivory Coast : common in the forest ! Exsicc.—*Chev.* 16406. *G. P. Cooper* 28 ; 137. *Linder* 628.

### 29. BERTIERA Aubl.—F.T.A. 3 : 82 ; Wernham in Journ. Bot. 1912 : 110.

Inflorescence with stalked lateral branchlets, lax-flowered :

Inflorence like that of *Heliotropium*, with few scorpioid branches at length recurved, pubescent ; leaves elliptic to broadly oblanceolate, acuminate, 7–12 cm. long, 3–6 cm. broad, sparingly pubescent below ; lateral nerves about 5 pairs ; flowers sessile ; calyx-lobes linear, recurved, 2–3 mm. long ; corolla very short ; fruit globose, 6 mm. diam., strongly ribbed, setulose .. .. .. 1. *breviflora*

Inflorescence more or less elongated and raceme-like :

Leaves rather broadly and shortly elliptic, abruptly acuminate, 8–12 cm. long, 3–6 cm. broad, pubescent on the 5–6 pairs of lateral nerves below ; inflorescence slender, many-flowered ; bracteoles linear ; calyx and corolla minutely pubescent ; corolla acute in bud, 7 mm. long ; fruit globose, 4 mm. diam., strongly ribbed 2. *bracteolata*

Leaves narrowly elongate-obovate, gradually acuminate, long-narrowed to the base, 10–20 cm. long, 4–8 cm. broad, thinly pubescent below on the 8–9 pairs of lateral nerves ; inflorescence rather few-flowered ; corolla 2 cm. long ; fruits as above 3. *laxa*

Leaves obovate, rather abruptly acuminate, cuneate from about the middle, 12–16 cm. long, 5–8 cm. broad, minutely pubescent on the lower surface, with 7–8 pairs of lateral nerves ; stipules lanceolate, very acute, 3·5 cm. long, about 7 mm. broad on the ultimate branchlets, minutely pubescent ; inflorescence slender, lax ; corolla 2 cm. long ; fruits as above.. .. .. .. .. .. 4. *Maitlandii*

Inflorescence with sessile or subsessile clusters of crowded flowers, or subsimply racemose :

Branchlets densely clothed with long spreading hairs ; leaves ovate-oblong, acutely acuminate, rounded or subcordate at the base, 15–25 cm. long, 4–7 cm. broad, pilose below especially on the 10–12 pairs of lateral nerves below ; inflorescence up to 20 cm. long ; calyx pubescent, with short triangular lobes ; corolla nearly 1 cm. long .. .. .. .. .. .. .. .. .. .. 5. *spicata*

Branchlets glabrous or with closely appressed hairs :

Flowers in crowded cymules on the main axis :

Calyx glabrous or with very minute and scattered short hairs ; limb of corolla in bud glabrous or glabrescent ; leaves oblong-elliptic, acutely acuminate, narrowly rounded at the base, distinctly petiolate, about 20 cm. long, 8–10 cm. broad, Calyx glabrous, nearly glabrous below ; flowers reflexed in bud : 6. *montana*

Calyx pubescent .. .. .. .. .. .. .. 7. *racemosa*

Calyx rather densely pubescent ; limb of corolla pubescent in bud :

Corolla-limb narrowly ellipsoid in bud, very acute ; leaves elongate-oblong-elliptic, shortly and gradually acuminate, about 18 cm. long and 7 cm. broad, appressed-pubescent on the 10–12 pairs of lateral nerves below ; inflorescence 8 cm. long ; stipules 2·5 cm. long, pubescent .. .. .. .. 8. *retrofracta*

Corolla-limb ovoid in bud, nearly as broad as long ; leaves oblong-lanceolate, gradually long-acuminate, up to 15 cm. long, 4–5 cm. broad, pubescent on the 8–10 pairs of lateral nerves below ; inflorescence about 10 cm. long ; stipules 1·5 cm. long, glabrous .. .. .. .. .. .. 9. *subsessilis*

Flowers on simple pedicels on the axis, very small; leaves oblong-elliptic, abruptly and broadly acuminate, 7–9 cm. long, 3–4 cm. broad, pubescent on the 4–5 pairs of lateral nerves below; stipules about 5 mm. long .. .. 10. *Chevalieri*

1. **Bertiera breviflora** *Hiern*—F.T.A. 3 : 85. A small shrub up to 10 ft. high, shortly pubescent, with small greenish-white flowers on the spreading branches of a terminal cyme.

S. Leone: several localities! Gold Coast: Assin Yan Kumasi! S. Nigeria! Lagos Colony, near Lagos! Epe! Ubulubu (fr. Feb.)! Barombi! Johann-Albrechtshöhe! Extends to Gabon. Exsicc.—*Barter* 3292. *Sc. Elliot* 4646; 4939. *Cummins* 124. *Rowland. Preuss* 324. *Staudt* 550.

2. **B. bracteolata** *Hiern*—F.T.A. 3 : 84. A shrub, more or less scandent with small whitish flowers in narrow spike-like panicles 6–12 in. long.

French Guinea: N'zo (fr. Mar.)! Sierra Leone: several localities (Nov., Dec.)! Liberia: Kakatown! Gbanga (Sept.)! Ivory Coast: various localities! Gold Coast: Western Prov., Asankrangwa (Aug.)! S. Nigeria: Oban! Calabar! Also in Cameroons. Exsicc.—*Sc. Elliot* 3922. *Whyte. Linder* 675. *N. W. Thomas* 5455; 5668; 8962. *Vigne* 1288. *Chev.* 12034; 17086; 17208; 17456; 19812; 21041; 21102.

3. **B. laxa** *Benth.*—F.T.A. 3 : 85; Chev. Bot. 318. A shrub up to 15 ft. high, with narrow flowers $\frac{3}{4}$ in. long in raceme-like cymes.

S. Nigeria: Oban! Johann-Albrechtshöhe! Fernando Po (Nov., Jan.)! Also in Cameroons. Exsicc.—*T. Vogel* 148. *Mann* 200. *Staudt* 579.

4. **B. Maitlandii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined.

Cameroons Mt.: Bulifumbo, Buea district 2,500 ft. (Mar.)! Exsicc.—*Maitland* 544.

5. **B. spicata** *Wernham* in Journ. Bot. 1912 : 160. *Pomatium spicatum* Gaertn. f. *B. africana* A. Rich.—F.T.A. 3 : 84; Stapf 611; Chev. Bot. 317, partly. A hairy shrub up to 8 or 9 ft. high, with small tubular pinkish flowers $\frac{1}{3}$ in. long in clusters on a spike-like panicle 4–12 in. long.

Senegal! French Guinea: Kindia! between Kouria and Ymbo. Sierra Leone: common! Liberia: Kakatown! Rippue's Town (Aug.)! Exsicc.—*Don. Heudelot* 719. *T. Vogel* 161. *Sc. Elliot* 4161. *Whyte. Linder* 361. *Deighton* 1740. *Chev.* 13003; 13083; 14998.

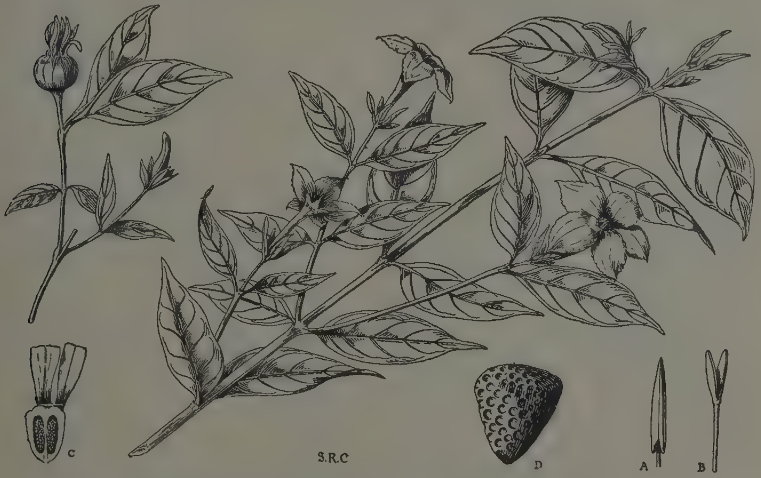

FIG. 204.—HEINSIA PULCHELLA *K. Schum.* (RUBIACEAE).

A, anther. B, style. C, longitudinal section of ovary. D, seed.

6. **B. montana** *Hiern*—F.T.A. 3 : 83. A shrub 20 ft. high with the habit of the last.

Fernando Po, 7,000 ft.! Exsicc.—*Mann* 292.

7. **B. racemosa** *K. Schum.* in Bol. Soc. Brot. 10 : 127. *Wendlandia racemosa* G. Don. *B. macrocarpa* Benth.—F.T.A. 3 : 84. *B. laxa* Chev. Bot. 318, not of Benth. A shrub or small tree up to 25 ft. high, with rather large leaves and spike-like panicles of tubular whitish flowers $\frac{3}{4}$ in. long.

Fairly common in forest from Gold Coast to S. Nigeria, extending to Angola, and in Princes Island. Exsicc.—*Barter* 10. *Thomson* 55; 101. *Millen* 13; 34. *Cummins* 49. *Thompson* 42. *Linder* 582. *Talb.* 1310; 3665. *Debeaux* 374. *Chev.* 15288; 15849; 17076; 17509; 17730; 19730; 19828. (See Appendix).

var. **glabrata** *Hutch. & J. M. Dalz.*—Corolla quite glabrous outside even in bud. *B. glabrata* K. Schum. Habit of the preceding.

Sierra Leone: Sasseni, Scarcies R. (fr. Jan.)! Kambui (Mar.)! Liberia: Sino Basin! Kakatown! Dukwia R. (Jan., fr. Feb.)! Exsicc.—*Sc. Elliot* 4523. *Whyte. Lane-Poole* 190; 191. *G. P. Cooper* 55; 258.

8. **B. retrofracta** *K. Schum.* in Engl. Bot. Jahrb. 23 : 452. *B. obversa* K. Krause. A shrub or small tree in habit like the preceding, with more or less quadrangular branchlets appressed brownish-pubescent when young, rather large leaves and pubescent flowers $\frac{1}{2}$ in. long.

S. Nigeria: Oban! Barombi (June)! Between Victoria and Bimbia (May)! Fernando Po, Bokoko (Oct.)! Exsicc.—*Preuss* 337; 1279. *Talb.* 236. *Mildbr.* 6833.

9. **B. subsessilis** *Hiern*—F.T.A. 3 : 83. A shrub like the last but with smaller narrower leaves, and flowers $\frac{1}{2}$ in. long.

S. Nigeria: Brass! Degema! Eket! Also in Congo Basin. Exsicc.—*Barter* 1831. *Talb.* 3067.

10. **B. Chevalieri** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with comparatively slender rusty-brown-pubescent branchlets and rather small flowers in narrow spike-like racemes 3–4 in. long.

French Guinea: Toma country, between Bérézia and Diorodougon. Exsicc.—*Chev.* 20786.

### 30. **HEINSIA** DC.—F.T.A. 3 : 80.

Branchlets very slightly pubescent; leaves elliptic-lanceolate, acutely acuminate, acute at the base, 5–10 cm. long, 2–4 cm. broad, slightly pubescent on the nerves below; stipules short and subulate; flowers usually solitary at the end of short branchlets; ovary setulose; calyx-lobes foliaceous, oblanceolate, 1–1·5 cm. long; corolla-tube 1·5–2·5 cm. long, appressed-tomentose, very setose-tomentose in the mouth, with style slightly exserted, limb 5–6 cm. diam, the lobes ovate to oblanceolate with crispate margins; fruit globose, 1–1·5 cm. diam., crowned with the calyx-lobes .. .. .. .. .. .. .. .. .. *pulchella*

**H. pulchella** *K. Schum.* in Engl. & Prantl, Natürl. Pflanzenfam. IV. 4 : 84. *Gardenia pulchella* G. Don. *H. jasminiflora* DC.—F.T.A. 3 : 81; Stapf 610. A shrub or a small tree up to 20–30 ft. or more, with jasmine-like flowers, white or sometimes pink with yellow hairs in the throat, 1½–2 in. across.

Sierra Leone to Ivory Coast: common! S. Nigeria: Lagos Colony! Lower Niger, ? locality! Oban! Fernando Po (fl. Dec., fr. July)! Extends to Portuguese E. Africa and to Angola. Exsicc.—*T. Vogel* 2; 158; 177. *Barter* 2064. *Mann* 402. *Sc. Elliot* 3921; 5705; 5818; 5860. *Whyte.* *G. P. Cooper* 102; 210; 236. *Linder* 111. *Punch* 46. *Talb.* 276; 281. *Kalbreyer* 12. (See Appendix).

### 31. **ATRACTOGYNE** Pierre in Bull. Soc. Linn. Paris N. S. 1: 1261 (1896) (*Afrohamelia* Wernham in Cat. Talb. Nig. Pl. 43, pl. 6).

A shrub climbing by recurved branchlets; branches terete, glabrescent; leaves ovate, acuminate, rounded or subcordate at the base, 7–10 cm. long, 3·5–5 cm. broad, those subtending the inflorescence much larger; petiole about 2 cm. long; inflorescence few-flowered, pedunculate; calyx cupular, dentate; corolla 1·3 cm. long; fruit oblong, long-stalked, about 3 cm. long .. .. .. .. .. *bracteata*

**A. bracteata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Afrohamelia bracteata* Wernham in Cat. Talb. Nig. Pl. 43, t. 6. *Atractogyne melongenifolia* A. Chev. Bot. 350, name only.

Ivory Coast: Bingerville district! Guidéko (May)! Cavally Basin, Tépos (Aug.)! S. Nigeria: Oban! Also in Cameroons and Gabon. Exsicc.—*Talb.* 1662. *Chev.* 15377; 16388; 19797.

### 32. **ADINA** Salisb.—F.T.A. 3 : 39.

Branchlets glabrous; stipules deciduous; leaves lanceolate, subacutely acuminate, acute at the base, 12–15 cm. long, 3–5 cm. broad, glabrous, with numerous lateral nerves slightly prominent below; flower heads axillary, solitary, globose, nearly 2·5 cm. diam.; peduncle 3 cm. long, with a pair of thin bracts above the middle; flowers sessile in the heads; calyx-lobes oblong, 1·5 mm. long; corolla 5 mm. long, silky-pubescent; style long-exserted, with an ellipsoid stigma .. *microcephala*

**A. microcephala** *Hiern*—F.T.A. 3 : 40; Chev. Bot. 307. A tall tree growing by streams, with creamy-white flowers in heads ½–¾ in. in diameter.

French Sudan: Gourma, Konkobiri. Gold Coast: N. Terr., Bantala (Apr.)! Togo: Syori (Apr.)! Dahomey: Atacora Mts., Somba country, 1,200–1,800 ft. (June)! N. Nigeria: Zungeru (Sept.)! Zaria Prov. (Mar.)! Bauchi! Extends to E. Sudan, Portuguese E. Africa, and in Angola. Exsicc.—*Elliott* 11. *Dalz.* 433. *Shaw* 98. *Kitson* 833. *Kersting* I. 57. (See Appendix).

### 33. **MITRAGYNA** Korth.—F.T.A. 3 : 40.

Leaves comparatively small, elliptic, acute, rounded at the base, 6–9 cm. long, 3·5–5 cm. broad, thinly pubescent on the nerves below; stipules soon falling off, intrapetiolar, cuneate in the lower part, oblong-lanceolate, acute, 1·5 cm. long, thin; flower-heads globose, 3·5 cm. diam., terminating short lateral branchlets, shortly pedunculate, peduncle tomentose; calyx and corolla glabrous outside; style long-exserted, stigma oblong, 1·5 mm. long; fruits with a callous ring at the apex .. 1. *inermis*

Leaves large, broadly elliptic, rounded at the apex and base, or shortly acute at the base, up to 30 cm. long and 15 cm. broad, glabrous or pubescent in the axils of the 7–10 pairs of lateral nerves; stipules very large, obovate-orbicular, flabellately nerved, up to 10 cm. long, glabrous or densely pubescent towards the base, soon falling off; flower-heads few in a panicle, about 2 cm. diam., calyx-lobes shortly ciliate; corolla-lobes silky on the outside; style exserted, stigma ellipsoid .. 2. *stipulosa*

1. **M. inermis** *O. Kuntze* Rev. Gen. 228; K. Schum. in Engl. & Prantl, Natürl. Pflanzenfam. 4, 4 : 56. *Uncaria inermis* Willd. *M. africana* Korth.—F.T.A. 3 : 40; Holl. 3 : 345; Chev. Bot. 307.

A small tree up to about 30 ft., with creamy strongly-scented flowers in solitary heads 1 in. in diam., chiefly in swamps.

Common from Senegal to Chad! In Nigeria south to Idah; also in Mauritania, and extending to E. Sudan. Exsicc.—*Roger.* *Perrottet.* *Sieber* 20. *T. Vogel* 40. *Ansell.* *Skues.* *Barter* 1189. *Sc. Elliot* 5378. *Brown* 929. *Pobéguin* 413. *Warnecke* 247. *Mildbraed* 7501. (See Appendix).

2. **M. stipulosa** *O. Kuntze* Rev. Gen. Pl. 228. *Nauclea stipulosa* DC. *N. stipulacea* G. Don. *M. macrophylla* Hiern—F.T.A. 3 : 41; Holl. 345; Chev. Bot. 307. *Sarcocephalus Pobeguinii* Hua—Chev. Bot. 306. A very large-leaved tree of swamps and river-sides, with globose flower-heads like the preceding but panicled.

Throughout the forested parts of tropical Africa extending along streams, etc., beyond the forest. Exsicc.—*T. Vogel* 138. *Barter* 2103; 3262. *Mann* 494. *Sc. Elliot* 5014. *Thompson* 5, 21. *G. P. Cooper* 312. *Chev.* 16234; 17235; 22301; B. 22302. (See Appendix).

### 34. **UNCARIA** Schreb.—F.T.A. 3 : 41.

Flowers sessile in the head; leaves glabrous below, elliptic or ovate-elliptic, rather long-acuminate, more or less rounded at the base, 8–15 cm. long, 4–7 cm. broad, with 4–5 pairs of arcuate lateral nerves below; spines recurved and hooked, 1–1·5 cm. long; flower-heads globose, 5 cm. diam.; calyx and corolla densely tomentose, the latter with reflexed hairs; fruiting head 10 cm. diam.; seeds with long tails, one of them split to the base .. .. .. .. .. .. .. .. 1. *africana*

Flowers pedicellate in the head:

Leaves glabrous on the midrib below, ovate or ovate-elliptic, acuminate, rounded at the base, 8–12 cm. long, 4–6 cm. broad, with about 5 pairs of lateral nerves; petiole 0·5–1 cm. long; spines recurved, 1–1·5 cm. long; flower-heads globose, about 6 cm. diam., pedicels 3–4 mm. long; calyx with lanceolate glabrescent lobes; corolla densely tomentose with reflexed hairs; style exserted, stigma ellipsoid 2. *angolensis*

Leaves pubescent on the midrib below, ovate-elliptic, acuminate, rounded at the base, 12–15 cm. long, 5–8 cm. broad, with 5–6 pairs of lateral nerves; petiole 1 cm. long. pubescent; spines much recurved and hook-like, about 3 cm. long; flower-heads 12–14 cm. diam.; pedicels 1 cm. long, tomentose; calyx with lanceolate setulose lobes; corolla about 3–3·5 cm. long, densely tomentose with reflexed hairs 3. *Talbotii*

1. **Uncaria africana** *G. Don*—F.T.A. 3 : 41; Stapf 609; Chev. Bot. 308. A shrub climbing by paired axillary hooks, with dense heads of yellowish silky flowers, the corolla about ½ in. long.

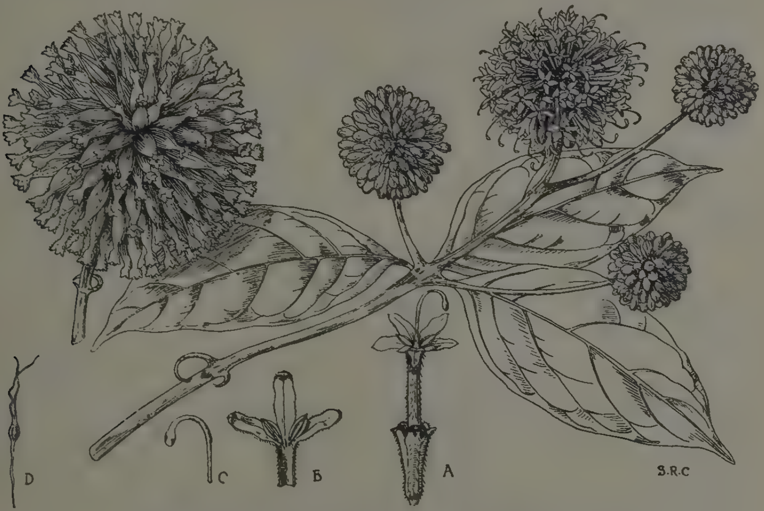

FIG. 205.—UNCARIA AFRICANA *G. Don* (RUBIACEAE).

A, flower. B, part of corolla laid open. C, stigma. D, seed.

French Guinea and Sierra Leone: common! Ivory Coast: Abidjean, Dabou. Gold Coast: Obuasi (fr. Jan.)! N. Nigeria: Abinsi (fr. Feb.)! S. Nigeria: Oban! Also in Uganda and Upper Belgian Congo. Exsicc.—*G. Don*. *T. Vogel* 117. *Barter* (no number). *Soward* 649. *Dalz.* 778. (See Appendix).

2. **U. angolensis** *Welw.* MS. *U. africana* var. *angolensis* Haviland. *Oorouparia africana* var. *angolensis* Hiern. A climbing shrub like the preceding but having the flowers in the head pedicellate.

S. Nigeria: Onitsha (Oct.)! Extends to Angola. Exsicc.—*N. W. Thomas* 1873.

3. **U. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 40. A climbing shrub with rather acutely 4-angled branches, hairy on the angles, and flowers about 1½ in. long in rather large heads.

Liberia: Gbanga (Sept.)! Gold Coast: Konongo, in closed forest (Oct.)! N. Nigeria: Lokoja, Patti (Oct.)! S. Nigeria: Oban! Exsicc.—*Talb.* 168; 274. *Dalz.* 39. *Vigne* 1394. *Linder* 480.

### 35. SARCOCEPHALUS Afzelius—F.T.A. 3 : 38.

Branchlets stout, glabrous or minutely puberulous; leaves broadly elliptic to rounded-ovate, abruptly and shortly acuminate, shortly cuneate to subcordate at the base, up to 18 cm. long and 10 cm. broad, glabrous or minutely puberulous on the nerves below, with 6–8 pairs of lateral nerves prominent below; petiole 1–1·5 cm. long; stipules very broadly triangular, shortly connate, about 6 mm. long, minutely puberulous; flowers in dense globose shortly pedunculate heads about 5–6 cm. diam.; calyx-teeth with filiform-clavate appendages which soon fall off, pubescent; corolla about 1 cm. long, lobes broadly obovate, minutely ciliate; style exserted; ovaries consolidated in fruit into a fleshy globose mass; seeds ellipsoid, verrucose 1. *esculentus*

Branchlets ribbed, papillous-puberulous, fistular; leaves very large, broadly oblong, rounded to a very shortly cuneate base, shortly and abruptly acuminate, 15–45 cm. long, 12–20 cm. broad, glabrous below, with 8–12 pairs of very prominent lateral nerves and numerous conspicuous parallel curved tertiary nerves; petiole 1–2 cm. long; stipules not seen; flower-heads subsessile, globose, 5–6 cm. diam.; calyx-teeth glabrous; corolla-tube about 1·3 cm. long, glabrous, lobes not ciliate; anthers shortly exserted .. .. .. .. .. .. .. .. 2. *nervosus*

1. **S. esculentus** *Afzelius*—F.T.A. 3 : 38. *S. Russeggeri* Kotschy—F.T.A. 3 : 39; Schweinf. Rel. Kotsch. 49, t. 33; Stapf 609; Holl. 3 : 343; Chev. Bot. 306. *Nauclea sambucina* Winterb., name only. *Sarcocephalus sambucinus* K. Schum. *S. sassandrae* A. Chev. A large tree in the forest, represented in open country and savannah woodlands by a small tree or shrub, with cream-white sweet-scented flower-heads 2 in. in diameter, and irregularly shaped dark-red fruit.

Throughout the area, and extending to Angola, E. Sudan and Uganda. Exsicc.—*Heudelot*. *T. Vogel* 172. *Barter* 1244. *Mann* 801. *Millen* 132. *Ozanne* 23. *Sc. Elliot* 4885; 5357. *Johnson* 952. *Dawodu* 23. *Phillips* 28. *Thompson* 89. *Chipp* 184; 469; 722. *Chev.* 17970. *Dalz.* 219. *G. P. Cooper* 279. *Pobéguin* 238. *Kersting* 83. *Linder* 12. (See Appendix).

2. **S. nervosus** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A large tree.

S. Nigeria: Oban! Also in Cameroons. Exsicc.—*Talb.* 1604 (Herb. Kew).

### **36. MUSSAENDA** Linn.—F.T.A. 3 : 65; Wernham in Journ. Bot. 1913 : 233.

Calyx-lobes never enlarged or petaloid:

Flowers cymose:

Calyx-lobes subulate, about 3 mm. long; corolla-tube shortly setose at the mouth; branchlets becoming glabrous or nearly so; leaves broadly elliptic to obovate, shortly acuminate, acute at the base, about 12 cm. long and 6 cm. broad, with about 6 pairs of lateral nerves, glabrous; corolla-lobes broadly elliptic, about 1 cm. long, finely scabrid inside; fruit ellipsoid-globose, the calyx deciduous 1. *arcuata*

Calyx-lobes linear or linear-spathulate, about 1 cm. long:

Leaves pubescent only on the nerves and veins below, elliptic, acuminate, subacute at the base, 6–14 cm. long, 3–7 cm. broad; corolla-lobes broadly obovate, nervose, 1·5–3 cm. long, up to 2·5 cm. broad; fruit oblong-ellipsoid, becoming glabrous, with persistent calyx-lobes .. .. .. .. .. .. 2. *elegans*

Leaves densely and softly tomentose below, silky above, obovate-elliptic, 7–9 cm. long, 4–5 cm. broad, with about 10 pairs of lateral nerves; petiole slender, 1–1·5 cm. long; flowers few; corolla densely tomentose; tube 2 cm. long, lobes ovate, nearly 1 cm. long .. .. .. .. .. .. .. 3. *nivea*

Calyx-lobes triangular; leaves broadly elliptic, acutely acuminate, 7–10 cm. long, 3·5–7 cm. broad, densely setose below; fruits 2 cm. long, hispid; imperfectly known species .. .. .. .. .. .. .. .. 4. *scabrida*

Flowers solitary or paired, terminal, subsessile; ovary setose-tomentose with reflexed hairs; calyx-lobes ovate, acuminate, nearly 1 cm. long; corolla-tube 2·5 cm. long, lobes ovate, 8 mm. long; branchets setulose-pubescent; leaves broadly elliptic or obovate-elliptic, acutely acuminate, broadly cuneate at the base, 8–12 cm. long, 4–7 cm. broad, with about 15 pairs of arcuate lateral nerves, thinly setulose on both surfaces .. .. .. .. .. .. .. .. .. 5. *uniflora*

Calyx-lobes (one of them) of some of the outer flowers enlarged and petaloid:

Normal calyx-lobes large and nearly as long as the corolla-tube, broadly oblong-lanceolate, 1·5–2 cm. long:

Hairs on the outside of the corolla-tube reflexed; tube 2·5 cm. long, lobes ovate, apiculate, 1·5 cm. long; leaves obovate-elliptic, acute, rounded or broadly obtuse at the base, 10–15 cm. long, 4–7 cm. broad, setose-pilose on the nerves below; flowers sessile in a terminal cluster; petaloid sepal ovate-rhomboid, acuminate, about 10 cm. long and 7 cm. broad .. .. .. .. 6. *grandiflora*

Hairs on the outside of the corolla-tube ascending; tube 3 cm. long, lobes suborbicular, apiculate, about 0·5 cm. long; leaves obovate or obovate-oblanceolate, abruptly acuminate, 8–12 cm. long, 3–5 cm. broad, thinly setose above, setose-pilose on the nerves below; lateral nerves about 15 pairs; flowers in a sessile cluster; petaloid sepal ovate, about 7–9 cm. long, setose-pubescent .. .. 7. *tristigmatica*

Normal calyx-lobes quite small, or if rather long then very narrow, much shorter than the corolla-tube:

Corolla-tube glabrous, or slightly pubescent chiefly on the nerves outside:

Lateral nerves up to 6 pairs:

Calyx and corolla glabrous outside; corolla-lobes in the open flower about 8 mm. long .. .. .. .. .. .. .. .. 1. *arcuata*

Calyx pubescent at least on the margin; corolla somewhat pubescent outside; corolla-lobes in the open flower 5 mm. long or less; leaves broadly elliptic, caudate-acuminate, rounded to subacute at the base, 9–12 cm. long, 5–7 cm. broad, glabrous with obscure spreading parallel tertiary nerves between the lateral; enlarged sepal 5-nerved at the base, ovate orbicular; corolla-tube 2 cm. long .. .. .. .. .. .. .. .. 8. *polita*

Lateral nerves 8–10 pairs; leaves elliptic to oblong-obovate, acutely acuminate, truncate to cuneate at the base, 7–12 cm. long, 3–7 cm. broad, more or less setulose above and below, especially on the nerves; enlarged sepal narrowly to broadly obovate; corolla-tube 2·5 cm. long .. .. .. .. 16. *Chippii*

Corolla-tube pubescent or tomentose all over the outside:

Calyx-lobes linear or subulate, much longer than broad:

Calyx-lobes about 1 cm. long; hairs on the shoots spreading or reflexed:

Leaves thinly setose on the nerves only below, broadly elliptic, shortly acuminate; lateral nerves about 7 pairs; petiole setose, 6 mm. long; calyx-lobes long-ciliate; corolla-tube 2·5 cm. long, long-pilose; enlarged sepal white, ovate, acuminate, about 9 cm. long and 6 cm. broad, setose 9. *conopharyngiifolia*

Leaves softly pubescent to tomentose below, broadly ovate-elliptic, acutely acuminate, acute to subcordate at the base, about 12 cm. long and 7 cm. broad; lateral nerves 10–12 pairs; corolla-tube densely pilose; enlarged sepal red or crimson .. .. .. .. .. .. .. .. 10. *erythrophylla*

Calyx-lobes up to about 6 mm. long; hairs on the shoots reflexed:

Calyx-lobes about 3 mm. long:

Leaves rounded to subcordate at the base, oblong-elliptic, acutely acuminate, 8–14 cm. long, 4–6 cm. broad, thinly setose below, especially on the 10–12 pairs of lateral nerves; hairs on inflorescence spreading 11. *landolphioides*

Leaves cuneate at the base, oblong-elliptic, very shortly and abruptly acuminate, 10 cm. long, 5 cm. broad, densely setose below, especially on the 10–12 pairs of lateral nerves; hairs on inflorescence appressed .. 12. *punctulata*

Calyx-lobes about 6 mm. long:

Leaves broadly elliptic, acutely acuminate, rounded to rarely subcuneate at the base, 9–12 cm. long, 5–8 cm. broad, setulose on the 8–10 lateral nerves below; petiole short .. .. .. .. .. .. .. 13. *tenuiflora*

Leaves narrowly obovate-elliptic, narrowly cuneate at the base, about 15 cm. long and 6 cm. broad, pilose on the nerves on both sides; petiole very long (2–3·5 cm.), pilose; corolla 1·5 cm. long .. .. .. 14. *lancifolia*

Calyx-lobes more or less triangular, not longer than broad or only slightly so:

Leaves at most thinly pubescent below, especially on the nerves:

Corolla at most shortly and scurfy-puberulous or nearly glabrous outside:

Lateral nerves 6–8 pairs, rather distant; branchlets glabrous or nearly so; corolla shortly and scurfy-puberulous outside .. .. 15. *Isertiana*

Lateral nerves 8–10 pairs, rather close and parallel; branchlets shortly appressed-pubescent; corolla very slightly pubescent outside .. .. 16. *Chippii*

Corolla densely tomentose with fairly long reflexed hairs outside; lateral nerves 12–14 pairs, rather close and parallel; branchlets rather densely pubescent 17. *Afzelii*

Leaves densely velvety-tomentose below, finely scabrid above, elliptic, 8–10 cm. long, about 5 cm. broad; lateral nerves 8–9 pairs; calyx about 6 mm. long, appressed-tomentose; enlarged sepal rather small, setulose 18. *Linderi*

1. **Mussaenda arcuata** *Poir.*—F.T.A. 3 : 68; Holl. 3 : 354. *M. laurifolia* A. Chev. A nearly glabrous shrub, erect or more or less climbing, with beautiful cymes of pale yellow flowers orange or deep purple in the hairy throat, over 1 in. long and ½–1 in. across.

Sierra Leone: Yetaya (Sept.)! Jigaya (Sept.)! Togo. N. Nigeria: Nupe! Kontagora (Apr.)! Katsina Allah! Bauchi Plateau, Naraguta (Apr., June)! S. Nigeria: Oban! Fernando Po! Distributed throughout tropical Africa. Exsicc.—*Barter* 1239. *Mann* (no number). *Dalz.* 403; 645. *Hill* 28. *N. W. Thomas* 2434; 2470; 2743; 2848.

2. **M. elegans** *Schum. & Thonn.*—F.T.A. 3 : 69; Holl. 3 : 354; Chev. Bot. 313. *M. elegans* vars. *rotundifolia* and *psilocarpa* Wernham. A much-branched shrub generally scrambling, with beautiful orange-red or flame-coloured flowers with yellow centre 2 in. or more across.

Common from French Sudan and Senegal to Cameroons! Extending to Congo, Angola and E. Africa. Exsicc.—*Heudelot* 806. *T. Vogel* 51. *Barter* (no number). *Thomson* 125. *Baikie*. *Mann* 844. *Sc. Elliot* 5795; 5817; 5871. *Millson*. *Rowland*. *Johnson* (no number). *MacGregor* 104. *Elliott* 75; 231. *Dalz.* 397. *Debeaux* 423. (See Appendix).

3. **M. nivea** *A. Chev.* Bot. 315, name only. A straggling shrub with silvery leaves and densely-silky flowers over 1 in. long.

Ivory Coast: Middle Sassandra, Guidéko (May)! Gold Coast: Dunkwa (July)! Osino! Exsicc.—*Chev.* 16467. *King-Church* 903. *Arnold* 371. (See Appendix).

4. **M. scabrida** *Wernham* in Journ. Bot. 1913 : 236. A shrub with roughly hairy branches, straggling or climbing; fruit ovoid 1 in. or more long, coarsely rusty-hairy.

Gold Coast: Ankobra Junction (fr. Jan.). S. Nigeria: Ebute Metta! Exsicc.—*Millen* 95. *Kitson* 1012.

5. **M. uniflora** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A scrambling or climbing shrub rather coarsely-hairy on the branchlets and leaf-nerves, with solitary flowers about 2 in. long densely yellow-tomentose on the outside.

French Guinea: Macenta, 2,000 ft.! Liberia: Monrovia (July)! Exsicc.—*Collenette* 28. *Linder* 14.

6. **M. grandiflora** *Benth.*—F.T.A. 3 : 70. *M. macrosepala* Stapf 610; Chev. Bot. 315. A rather coarsely-hairy straggling shrub with yellow hirsute flowers 1½–2 in. long and over 1 in. across the corolla-limb.

Sierra Leone: ? locality! Njala (July)! Liberia: several localities! Ivory Coast: various localities. Exsicc.—*Don*. *Whyte*. *Dawe* 503. *Deighton* 722. *Bunting* 146.

7. **M. tristigmatica** *Cummins* in Kew Bull. 1898 : 74; Chev. Bot. 315. A scrambling shrub with bristly-hairy branchlets and yellow hirsute flowers 1–1½ in long in a dense cluster; fruits 1–1½ in. long, covered with soft rusty hairs.

Ivory Coast: Abidjean, Dabou! Dyola country, between Danané and Mt. Kouan; Upper Cavally, Gouro. Gold Coast: Axim and vicinity (Dec., fr. Apr.)! Bou, Western Prov. (fr. Nov.)! Assin Yan

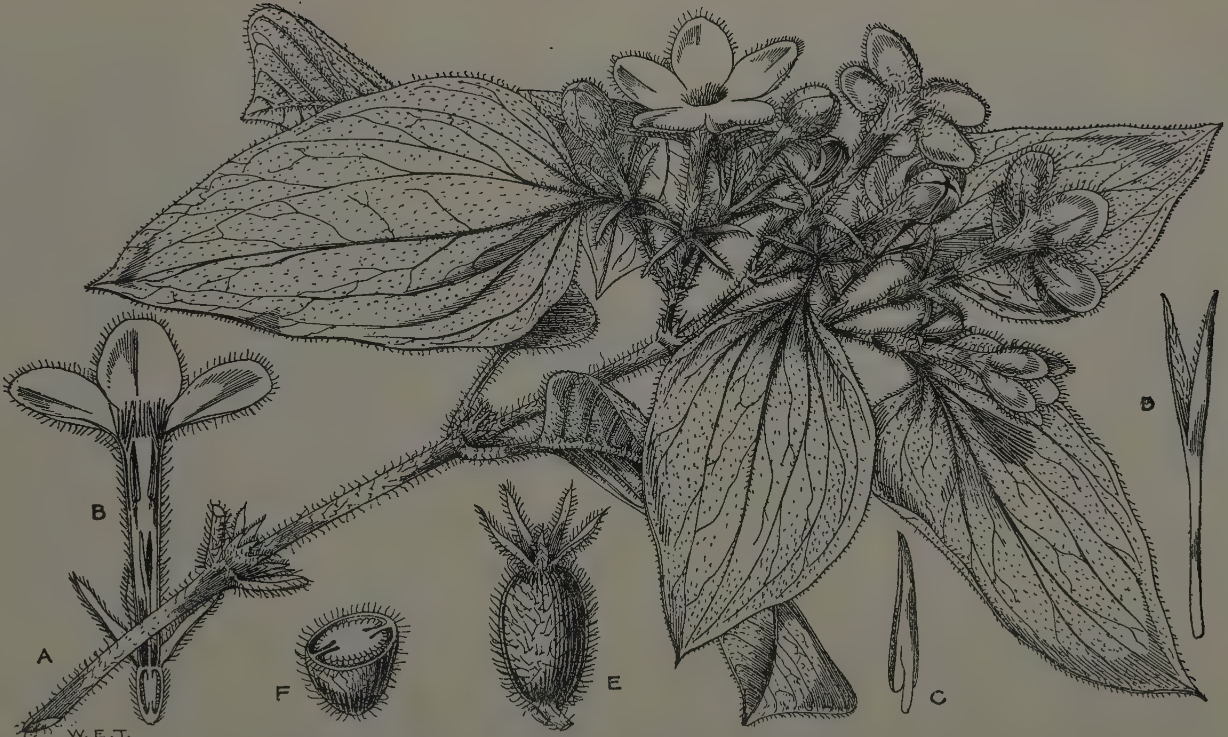

FIG. 206.—MUSSAENDA ERYTHROPHYLLA *Schum. & Thonn.* (RUBIACEAE).
A, flowering shoot. B, longitudinal section of flower. C, stamen. D, style. E, young fruit. F, cross-section of ovary.

Kumasi ! Begoro (July) ! Kwahu, 2,000 ft. (Mar.) ! Exsicc.—*Cummins* 41 ; 113. *Johnson* 716 ; 877. *Chipp* 169. *Moor* 97.

8. **M. polita** *Hiern*—F.T.A. 3 : 67. A glabrous climbing shrub with shining foliage and narrow yellow flowers ¾–1½ in. long in lax terminal cymes.
S. Nigeria : Oban ! Calabar ! Cross R. (Dec.) ! Extends to Gabon. Exsicc.—*Holl.* 228. *Williams* 25 ; 26 ; 36. *Talb.*

9. **M. conopharyngiifolia** *Stapf* in Journ. Linn. Soc. 37 : 104 ; Stapf 610 ; Chev. Bot. 313. A straggling shrub with rather large leaves and hirsute terminal corymbs of narrow orange-yellow flowers 1 in. or more long ; fruits peach-like, yellowish red.
Liberia : Sino Basin ! Ivory Coast : several localities. Exsicc.—*Whyte.*

10. **M. erythrophylla** *Schum. & Thonn.*—F.T.A. 3 : 69 ; Holl. 3 : 354 ; Chev. Bot. 314. Usually a climbing shrub but sometimes more or less erect or even a small tree with a definite trunk, softly rusty pubescent, the leaves often pale-tomentose below ; flowers 1–1½ in. long in dense hispid cymes, the corolla cream or pale yellow, with one conspicuous blood-red sepal.
Common in forest land from French Guinea to Togo ! N. Nigeria : Bauchi Plateau, several stations ! S. Nigeria : Johann-Albrechtshöhe. Camerons Mt. : Buea, Victoria and vicinity, up to 4,500 ft. (Mar.) ! Extends to Angola, Ubangi-Shari and Uganda. Exsicc.—*Mann* 1278. *Cummins* 3P. *Sc. Elliot* 4608. *Thompson* 62. *Lamb. Lely* P. 230 ; P. 237 ; 288. *Dent Young* 110. *Preuss* 766. *Deistel* 642. *Kalbreyer* 93. *Krause.* (See Appendix).

11. **M. landolphioides** *Wernham* in Journ. Bot. 1913 : 238. *M. brachyantha* Wernham. A woody climber with harsh reflexed hairs on the branchlets, leaves rather pale below, and narrow yellow flowers 1–1¼ in. long densely reddish-pilose, rather numerous in terminal cymes.
Liberia : Gola ! S. Nigeria : Lagos, Ikoyi (Aug., Oct., Nov.) ! Ibadan ! Ubuluku (Dec.) ! Exsicc.—*Millen* 100. *Foster* 157. *Dalz.* 1197 ; 1384. *N. W. Thomas* 2091. *Bunting* 147.

12. **M. punctulata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Climbing shrub ; corolla yellow ; enlarged sepal white.
Liberia : Miamu (Sept.) ! Exsicc.—*Linder* 368.

13. **M. tenuiflora** *Benth.*—F.T.A. 3 : 69 ; Holl. 3 : 355. *M. entomophila* Wernham. A scrambling or climbing shrub with branchlets and flowers more or less like the last.
S. Nigeria : Epe ! Degema ! Eket ! Calabar (Mar., Aug.) ! Aro-Chuku (Apr.) ! Oban ! Victoria ! Fernando Po (Nov.) ! Extends to Gabon. Exsicc.—*T. Vogel* 67. *Barter* 1232 ; 2068 ; 3308. *Mann* 60. *Thomson* 86. *Holl.* 73 ; 81. *Talb.* 275 ; 3001 ; 3116 ; 3117 ; 3803. *Kalbreyer* 71. *Preuss* 879 ; 1165.

14. **M. lancifolia** *K. Krause* in Engl. Bot. Jahrb. 57 : 28. Enlarged sepal whitish ; corolla dark yellow.
Fernando Po : Bokoko (Oct.) ! Exsicc.—*Mildbr.* 6813.

15. **M. Isertiana** *DC.*—F.T.A. 3 : 67 ; Holl. 3 : 355 ; Chev. Bot. 314. *M. afzelioides* Wernham. A shrub more or less climbing subglabrous except on the young parts, with yellow or orange-coloured flowers 1½–2 in. long usually numerous in terminal cymes ; fruit ellipsoid ¾–1 in. long, becoming glabrous, not ribbed.
Sierra Leone : ? locality (June) ! Dahomey : Porto-Novo and environs (Jan., Mar.) ! N. Nigeria : Bassa (Aug.) ! S. Nigeria : Lagos, Ikoyi, etc. ! Abeokuta ! Aguku. Brass ! Degema (Sept.) ! Eket ! Calabar (Apr.) ! Oban ! Cameroons R. (Jan.) ! Fernando Po (Nov.) ! Exsicc.—*T. Vogel* 6 ; 226. *Barter* 58 ; 3236. *Mann* 2209. *Irving.* *Millen* 46. *Elliott* 94. *Talb.* 1306 ; 3000 ; 3124. *Talb.* 212 ; 275. *Kalbreyer* 221.

16. **M. Chippii** *Wernham* in Journ. Bot. 1913 : 237. *M. Buntingii* Wernham. A shrub, more or less straggling or climbing with rusty puberulous but glabrescent branchlets and yellow or orange-coloured slender flowers, 1–1½ in. long and ½ in. across when open, in terminal cymes.
Sierra Leone : Kennema (Oct.) ! Malema (Nov.) ! Liberia : Begwai ! Kakatown ! Gbanga (Sept.) ! Moala-suen (Nov.) ! Miamu (Aug.) ! Ivory Coast : Yapo (Oct.) ! Gold Coast : Bou, Western Prov. (Nov.) ! W. Appollonia (Aug.) ! Ankoba Junction (Jan.) ! Kickham W. Prov. (Oct.) ! Nsuam (Sept.) ! Exsicc.—*Chipp* 323. *Bunting* 144. *Lane-Poole* 470. *Aylmer* 269. *Deighton* 328. *Vigne* 1585. *Linder* 535 ; 819 ; 1384 ; 366. *Johnson* 878. *Fishlock* 51. *Kitson* 1008. *Chev.* B. 22366.

17. **M. Afzelii** *G. Don* –F.T.A. 3 : 66 ; Chev. Bot. 313. A shrub usually straggling or scandent, sometimes erect, with rather harshly pubescent branchlets and bright yellow flowers 1–1¼ in. long in dense cymes ; fruits ellipsoid, 1 in. long, rusty-tomentose, slightly ribbed ; in marshy places.
French Guinea : Between the Konkouré and Timbo ; Kindia : Sierra Leone : common ! Liberia : Dukwia R. (May) ! Gold Coast : Ankobra Junction (fr. Jan.) ! S. Nigeria : R. Niger, Ibo ! Exsicc.—*Don.* *T. Vogel* 7. *Barter* (no number). *Winwood Reade.* *Sc. Elliot* 4166. *G. P. Cooper* 413. *Kitson* 1013. (See Appendix).

18. **M. Linderi** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined.
Liberia : Gbanga (Sept.) ! Exsicc.—*Linder* 536.

## 37. UROPHYLLUM Wall.—F.T.A. 3 : 72.

Inflorescence as long as or longer than the leaves, openly cymose ; stipules large and foliaceous :
- Calyx glabrous, shortly toothed ; branches of inflorescence puberulous with very short crispate hairs ; leaves broad at the base, oblong-elliptic, acuminate, up to 20 cm. long and 7 cm. broad, glabrous below, except in the axils of the nerves, with 15–20 pairs of lateral nerves, reticulate between the nerves ; stipules broadly ovate, abruptly mucronate .. .. .. .. .. .. .. 1. *floribundum*
- Calyx shortly pubescent outside, undulate ; branches of the inflorescence pubescent with loose hairs ; leaves similar to above but acute at the base ; fruits globose, wrinkled when dry, about 0·5 cm. diam., capped by the cupular calyx ; stipules as above but gradually acute .. .. .. .. .. 2. *viridiflorum*

Inflorescence very short and crowded :
- Branches glabrous :
  - Leaves broadly oblong-elliptic, broadly and shortly acuminate, 10–15 cm. long, 4–6 cm. broad, reddish below, with about 10 pairs of lateral nerves veiny between ; stipules broad and somewhat foliaceous ; calyx truncate, entire ; corolla conical in bud .. .. .. .. .. .. .. .. .. 3. *rubens*
  - Leaves oblong-elliptic, broadly long-acuminate, mucronate, shortly cuneate at the base, 10–12 cm. long, 3–4·5 cm. broad, glabrous, with 5–6 pairs of lateral nerves ; flowers few in axillary fascicles ; pedicels 3 mm. long, glabrous ; calyx glabrous ; corolla-tube 4 mm. long, throat pubescent ; anthers half-exserted 4. *sylvicola*
  - Leaves lanceolate, acutely long-acuminate, 6–10 cm. long, 1·5–3 cm. broad, glabrous, with about 8 pairs of arcuate nerves ; stipules subulate .. 5. *paucinerve*

Branches pubescent :

Flowers few in sessile or subsessile axillary clusters ; lateral nerves up to 14 pairs :

Lateral nerves with numerous parallel tertiary nerves at right angles to them or to the midrib :

Lateral nerves 5–6 pairs ; leaves oblong-elliptic, broadly acuminate, 4–6 cm. long, 1·5–3 cm. broad, glabrous below ; stipules subulate, about 6 mm. long 6. *canthiiflorum*

Lateral nerves about 15 pairs ; leaves narrowly oblong-elliptic, acutely acuminate, 15–18 cm. long, 5–6 cm. broad, rather densely pilose below ; stipules lanceolate, 1·5–2 cm. long .. .. .. .. .. .. .. 7. *stipulosum*

Lateral nerves with much branched reticulate veins between :

Flowers very small, in axillary clusters :

Branchlets very shortly pubescent ; leaves oblong-lanceolate, broadly acuminate, about 8 cm. long and 2–2·5 cm. broad .. .. .. .. 8. *Afzelii*

Branchlets pilose with spreading hairs ; leaves oblong-elliptic, broadly acuminate, about 12 cm. long and 5 cm. broad, pilose on the nerves below ; stipules long-subulate .. .. .. .. .. .. .. .. 9. *insculptum*

Flowers large (for the genus) ; calyx-lobes long and filiform, plumose-pilose ; corolla 1·5 cm. long ; leaves oblong or oblong-elliptic, acutely acuminate, about 12 cm. long and 3–5 cm. broad, shortly pilose on the nerves below 10. *Linderi*

Flowers numerous in shortly pedunculate cymes ; lateral nerves about 20 pairs, pubescent below ; tertiary nerves faint ; leaf-blade broadly oblong-oblanceolate, very acutely acuminate, acute at the base, 15–20 cm. long, up to 9 cm. broad ; cymes dense-flowered, shortly pubescent ; calyx cupular, truncate ; corolla 6 mm. long .. .. .. .. .. .. .. .. .. 11. *hirtellum*

1. **Urophyllum floribundum** *K. Schum. & K. Krause* in Engl. Bot. Jahrb. 39 : 523. An erect shrub 12–25 ft. high, with red-brown branchlets and branched inflorescence, sometimes longer than the leaves, of small white flowers turning brown in drying.
S. Nigeria : Eket ! Also in Cameroons. Exsicc.—*Talb.* (no number).

2. **U. viridiflorum** *Schweinf. ex Hiern*—F.T.A. 3 : 74. *U. eketense* Wernham. An erect shrub up to 20 ft. high, with greenish compressed younger branchlets, leaves with numerous prominent lateral nerves, and branched terminal or axillary inflorescence of small greenish flowers.
S. Nigeria : Eket ! Also in Cameroons and extending to Upper Nile land and Uganda. Exsicc.—*Talb.* 3327.

3. **U. rubens** *Benth.*—F.T.A. 3 : 73. A glabrous shrub with red-purple branchlets and leaves colouring to wine-red on the nerves.
Fernando Po (Oct.) ! Exsicc.—*T. Vogel* 48.

4. **U. sylvicola** *Hutch. & J. M. Dalz.* in Kew Bull, 1931 : ined. Flowers greenish-white ; berries subglobose, red.
Liberia : Medina, Bumbuna (Oct.) ! Exsicc.—*Linder* 1307.

5. **U. paucinerve** *Hiern*—F.T.A. 3 : 74. A shrub 10–15 ft. high with slender green branchlets and very small flowers in short axillary cymes.
Fernando Po, 4,000 ft. (Nov.) ! Exsicc.—*Mann* 577.

6. **U. canthiiflorum** *Hutch. & J. M. Dalz.* *U. Talbotii* Wernham. *Pauridiantha canthiiflora* Hook. f.—F.T.A. 3 : 71 ("*canthiifolia*"). A shrub 6–15 ft. high, with shortly pubescent slender branchlets, the leaves with close transverse venation ; flowers very small yellowish in small axillary cymes or sometimes solitary.
S. Nigeria : Oban ! Johann-Albrechtshöhe ! Man of War Bay (Oct.) ! Fernando Po (Jan.) ! Exsicc.—*Mann* 167. *Talb.* 225. *Staudt* 566. *Winkler* 548.

7. **U. stipulosum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with densely pubescent branchlets, fairly large many-nerved leaves, and small white flowers with green hairy bracteoles crowded in dense axillary head-like clusters.
Liberia : Du River (July) ! Dukwia R. (Oct., Nov.) ! Exsicc.—*Linder* 86. *G. P. Cooper* 37 ; 205.

8. **U. Afzelii** *Hiern*—F.T.A. 3 : 73 ; Chev. Bot. 315. *U. micranthum* A. Chev. Bot. 315, not of Hiern. A shrub up to 6–8 ft. high, with slightly pubescent green branchlets, small greenish-white axillary flowers and small red or black berries.
Common in the forest area from French Guinea to S. Nigeria ! Exsicc.—*Afzelius.* *Sc. Elliot* 4316 ; 4694 ; 4701 ; 5029 ; 5133 ; 5263 ; 5413 ; 5593. *Rowland.* *Burton & Cameron.* *G. P. Cooper* 48 ; 250. *Chev.* 12301 ; 12426 ter ; 13520 bis.

9. **U. insculptum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with shortly hirsute branchlets.
S. Nigeria : Oban ! Exsicc.—*Talb.* (no number).

10. **U. Linderi** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with densely brown hirsute branchlets, and white flowers $\tfrac{2}{3}$–1 in. long, few in sessile axillary clusters with filiform pilose calyx-lobes and bracteoles.
Liberia : Peahtah (Oct.) ! Kakatown ! Dukwia R. (Oct., Nov.) ! Exsicc.—*Linder* 1072. *G. P. Cooper* 36 ; 151. *Whyte.*

11. **U. hirtellum** *Benth.*—F.T.A. 3 : 72 ; Stapf 610. A shrub or small tree, usually more or less hairy, with rather long many-nerved leaves, and greenish-white flowers crowded in short axillary cymes.
Sierra Leone : several localities, up to 4,000 ft. ! Liberia : Sino Basin ! Gold Coast : West. Prov., Nkroful (Nov.) ! Essiama (Oct.) ! S. Nigeria : Lagos, Ikoyi (Feb., July) ! Ebute Metta ! Niger R., Ibo (Aug.) ! Degema ! Calabar (Feb.) ! Man of War Bay (Brit. Cameroons) ! Also in French Cameroons. Exsicc.—*T. Vogel* 25. *Mann* 868 ; 2237. *Sc. Elliot* 5058. *Smythe* 257. *Whyte.* *Dalz.* 1200 ; 1376. *Vigne* 1409. *Talb.* 3633. *Schlechter* 12380.

### 38. SABICEA Aubl.—F.T.A. 3 : 74 ; Wernham Monogr. Sabicea (Brit. Mus. Nat. Hist. 1914).

*Leaves more or less thinly pilose or pubescent below, not completely covered with a felt of hairs :

†Flowers on the young shoots accompanied by the leaves :

Flowers solitary in the leaf-axils :

Calyx-lobes 5 mm. long ; leaves ovate-elliptic, acute at both ends, 8–10 cm. long, 3·5–5 cm. broad, very shortly pubescent on the nerves below ; petiole 1–1·5 cm. long ; stipules ovate-lanceolate, 6 mm. long .. .. .. 1. *bracteolata*

Calyx-lobes 1–1·5 cm. long; leaves ovate elliptic, cordate at the base, 10–12 cm. long, 4–6 cm. broad, setulose on the 9–12 lateral nerves below; petiole 2–3 cm. long, pilose; stipules ovate, 1 cm. long; flowers subsessile, surrounded by cupular bracts; corolla densely villous .. .. .. .. 2. *cordata*

Flowers clustered:

Ovary and calyx glabrous or the latter sparingly ciliate; flowers surrounded with several pink bracts; leaves oblong-elliptic, acutely acuminate, rounded to cordate at the base, 5–8 cm. long, 3–4 cm. broad, thinly pilose below, with 8–12 pairs of lateral nerves; peduncle up to 8 cm. long; corolla glabrous .. 3. *calycina*

Ovary and calyx more or less pubescent:

Calyx-lobes short, not more than 3 mm. long:

Flowers in small open cymes; calyx-lobes short, not more than 3 mm. long; leaves oblong-elliptic to ovate, acutely acuminate, rounded to truncate at the base, 8–10 cm. long, about 4–5 cm. broad, setulose on the nerves below; corolla pilose outside .. .. .. .. .. .. .. .. 4. *venosa*

Flowers very numerous in dense bracteate cymes; leaves elliptic, subacute at the base, obtusely pointed, about 1·5 cm. long and 7 cm. broad, with about 25 pairs of parallel lateral nerves; bracts broadly elliptic-obovate; corolla very small, tomentose at the apex .. .. .. .. .. .. 5. *floribunda*

Flowers in small heads; leaves ovate-elliptic, acuminate, 8–9 cm. long, 3·5–4 cm. broad, scabrid above, sparingly pubescent below, with about 10 pairs of lateral nerves; ovary densely villous.. .. .. .. .. .. 6. *Talbotii*

Calyx-lobes 5 mm. long or more:

Climbing or erect shrubs; not rooting at the nodes:

Flowers few together, up to about 5 in each cluster, sessile:

Leaves ovate, long-acuminate, rounded at the base, very shortly petiolate, 7–9 cm. long, 3–5 cm. broad, rather densely villous; corolla villous, a little longer than the calyx; stipules ovate, about 1 cm. long .. 7. *brevipes*

Leaves oblong-elliptic, shortly cuneate at the base, rather long-petiolate, 6–10 cm. long, 3–4 cm. broad, pubescent only on the nerves; corolla villous, a little longer than the calyx; stipules about 6 mm. long; peduncle 2 cm. long .. .. .. .. .. .. .. .. .. 8. *Robbii*

Leaves elongate-oblong-obovate, long-attenuated at the base, 30–45 cm. long, 8–11 cm. broad, appressed-tomentose only on the nerves below; stipules very large and imbricate, about 6 cm. long .. .. .. 9. *gigantistipula*

Flowers more numerous in each cluster, mostly shortly pedicellate; leaves ovate, rather long-petiolate, about 8 cm. long and 4 cm. broad, thinly pilose, with about 6 pairs of lateral nerves; corolla shortly pubescent.. 10. *Vogelii*

Flowers in a dense globose head about 2·5 cm. diam.; calyx-lobes linear, 7 mm. long, strigose-pubescent; peduncle 1·5–2 cm. long; corolla-tube glabrous outside; leaves oblong-elliptic, very shortly and obtusely acuminate, 6–8 cm. long, 3–4 cm. broad, setose-pubescent on both sides; lateral nerves 8 pairs 11. *globifera*

Creeping undershrub rooting at the nodes, more or less pilose all over; leaves elliptic, 2–3·5 cm. long, 1·5–2 cm. broad, long-petiolate; heads pedunculate, about 3 cm. diam.; peduncle 2 cm. long; calyx and ovary densely long-pilose with jointed hairs .. .. .. .. .. .. 12. *geophiloides*

††Flowers on the older branchlets devoid of leaves:

Lateral nerves 8–10 pairs:

Leaves rounded or subcordate at the base, broadly elliptic, about 15 cm. long, long-bristly pilose on the nerves below; stipules ovate, 1 cm. long; calyx-lobes linear-filiform, 1·5 cm. long .. .. .. .. .. 13. *speciosa*

Leaves cuneate at the base, obovate, long-caudate-acuminate, 12–15 cm. long, 4–7 cm. broad, thinly pilose above and on the nerves below; stipules ovate-acuminate, 1 cm. long; calyx-lobes ovate-lanceolate, acute, 1·5 cm. long, long-ciliate; corolla villous .. .. .. .. .. .. .. 14. *pilosa*

Lateral nerves about 20–25 pairs; leaves cuneate at the base, 30 cm. long or more, about 18 cm. broad:

Leaves shortly pubescent on the nerves below, weakly pilose above, ciliate; stipules ovate, 3 cm. long; young branchlets densely hispid with long spreading hairs; calyx-lobes filiform .. .. .. .. .. .. 15. *xanthotricha*

Leaves long-pilose on the nerves below, pilose above; stipules about 6 cm. long; young branchlets densely villous; calyx-lobes filiform, pilose 16. *Urbaniana*

**Leaves completely covered below with a dense felt of hairs:

Flowers in a loose shortly pedunculate cyme; leaves oblong- or ovate-elliptic, acutely acuminate, 6–9 cm. long, 3–4·5 cm. broad, shortly pilose above, with 12–18 pairs of lateral nerves; stipules ovate, about 7 mm. long; corolla appressed-pubescent outside, 1 cm. long.. .. .. .. .. .. .. .. 17. *discolor*

Flowers in a globose head, with an involucre of bracts:

Calyx-lobes neither linear nor filiform, not much longer than the ovary:

Flowers pedicellate in the heads :

Calyx-lobes narrowly lanceolate, 5–6 mm. long, ciliate ; pedicels about 6 mm. long ; leaves ovate-elliptic, acutely acuminate, 8–13 cm. long, 4–6 cm. broad, with up to about 20 pairs of lateral nerves ; corolla a little longer than the calyx, pubescent at the tip .. .. .. .. .. 18. *Johnstonii*

Calyx-lobes narrowly triangular, reflexed, about 2·5 mm. long, woolly outside ; leaves as above but with about 10 pairs of lateral nerves ; corolla much longer than the calyx .. .. .. .. .. .. .. 19. *pedicellata*

Flowers sessile or subsessile in the heads :

Leaves cobwebby above when young, elliptic to ovate, subacute at both ends, 8–12 cm. long, 4–6·5 cm. broad, with 10–14 pairs of prominent lateral nerves ; peduncle about 5 cm. long ; calyx-lobes oblong, 4 mm. long, tomentose ; corolla pubescent .. .. .. .. .. .. .. .. 20. *lanuginosa*

Leaves setose above when young, ovate-elliptic to oblanceolate, very variable in size, up to 15 cm. long and 8 cm. broad ; peduncle up to 2 cm. long, sometimes branched .. .. .. .. .. .. .. .. 21. *capitellata*

Calyx-lobes linear or filiform, nearly as long as the corolla :

Peduncle slender, about 10 cm. long ; flowers loose in the head and pedicellate ; leaves oblong-elliptic, about 14 cm. long and 7 cm. broad, yellowish-tomentose below when dry, with 15–18 pairs of lateral nerves ; stipules ovate, striate, 1 cm. long ; calyx-tube glabrescent .. .. .. .. .. 22. *ferruginea*

Peduncle short, up to about 4 cm. long ; flowers densely crowded and subsessile :

Leaves broadly elliptic, about 17 cm. long and 10 cm. broad ; stipules broadly ovate-triangular, 2 cm. long, striate .. .. .. .. 23. *lasiocalyx*

Leaves obovate, cordate at the base, long-petiolate, 10–12 cm. long, 4–5 cm. broad, thin, pilose on the 10–12 pairs of lateral nerves below ; stipules ovate-orbicular, about 5 mm. long ; petiole 1·5–3 cm. long .. .. .. 24. *arachnoidea*

1. **Sabicea bracteolata** *Wernham* Monogr. Sabicea 73. A shrub, the branchlets densely rusty-tomentose when young, with solitary axillary flowers about ¾ in. long silky-pubescent outside.
French Guinea : Labé (Apr.) ! Exsicc.—*Chev.* 12367 ; 12390.

2. **S. cordata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A hairy climbing shrub with deep red densely hairy tubular flowers over 1 in. long, and bright red fruits.
Gold Coast : Mampong Scarp (Apr.) ! Nsuta (May) ! Exsicc.—*Dalz.* 54. *Vigne* 1738.

3. **S. calycina** *Benth.*—F.T.A. 3 : 76 ; Wernham l.c. 63 ; Chev. Bot. 316. *S. Barteri* Wernham. A climbing shrub, sometimes trailing and rooting at the nodes, with white flowers in heads, the calyx and surrounding membranous bracts usually more or less coloured.
Sierra Leone : Bumbuna (Oct.) ! Ivory Coast and Gold Coast : common ! Togo : Togba Tota (June) ! N. Nigeria : ? locality. S. Nigeria to Cameroons : common ! Fernando Po ! Extends to Congo. Exsicc.—*T. Vogel* 35. *Barter* 1248 ; 3282. *Mann* 53. *Moloney* 25. *Rowland* 55. *Millen* 63 ; 163. *Punch* 63. *Cummins* 148. *Brown* 404. *Farmar* 379. *Elliott* 77. *Krause.* *Schlechter* 13024. (See Appendix).

4. **S. venosa** *Benth.*—F.T.A. 3 : 77 ; Wernham l.c. 32 ; Chev. Bot. 317. *S. discolor* A. Chev. Bot. 316, not of Stapf. A climbing shrub with branchlets pubescent or subglabrous, whitish flowers ⅓–½ in. long crowded in shortly pedunculate axillary cymes, and white or red berries ¼ in. in diameter.
Senegal ! French Guinea : Timbo (Mar.) ! Sierra Leone : various localities ! Liberia. Ivory Coast : Guidéko ; Dabou ; Malamalasso ! Gold Coast : Axim ! Tarkua (Feb.) ! Essiama ! Cameroons Mt. : Buea, 3,300 ft. (July) ! Also in French Cameroons and extending to Congo. Exsicc.—*Heudelot* 821. *Don.* *Sc. Elliot* 5276. *Smythe* 58. *Burton & Cameron.* *Thompson* 46. *Fishlock* 11. *Miles* 7. *Maitland* 32. *Preuss* 872a. *Chev.* 17493.

5. **S. floribunda** *K. Schum.* in Engl. Bot. Jahrb. 23 : 428 ; Wernham l.c. 72. A climbing shrub, the branchlets at first rather densely pilose, the leaves with numerous nerves, with greenish-white flowers in diffuse panicles of small cymes, and whitish fruits.
S. Nigeria : Oban ! Also in Cameroons and Congo Basin. Exsicc.—*Talb.* 228.

6. **S. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 43. Habit of the preceding.
S. Nigeria : Oban ! Exsicc.—*Talb.* 2032.

7. **S. brevipes** *Wernham* Monogr. Sabicea 58. A woody climber rather densely appressed-silky, with white or pinkish flowers ½–¾ in. long silky outside in subsessile head-like clusters.
Togo (not seen). N. Nigeria : Bauchi Plateau, Naraguta (June) ! Vodni, 4,600 ft. (July) ! Also in Congo Basin. Exsicc.—*Lely* 284 ; 427.

8. **S. Robbii** *Wernham* Monogr. Sabicea, 69. A shrub 12–15 ft. high, with strigose branchlets and whitish flowers in involucrate oblong heads.
S. Nigeria : Calabar ! Also in Gabon. Exsicc.—*Robb.*

9. **S. gigantistipula** *K. Schum.* in Engl. Bot. Jahrb. 33 : 337. Erect shrub 10 ft. high, soft-wooded with long leaves and flowers ⅜ in. long.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.* 259.

10. **S. Vogelii** *Benth.*—F.T.A. 3 : 76 ; Wernham l.c. 43 ; Chev. Bot. 317. A rather slender climbing shrub, the branchlets softly pubescent or glabrescent, with white or pinkish flowers over ½ in. long in shortly pedunculate heads.
French Guinea : Futa-Jallon, Labé (Apr.), Diaguissa Plateau (Apr.) ; ? locality ! Sierra Leone : many localities ! Exsicc.—*Don.* *Afzelius.* *T. Vogel* 87. *Barter.* *Winwood Reade.* *Sc. Elliot* 3871 ; 4175. (See Appendix).

11. **S. globifera** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined.
Sierra Leone : Kennema (Apr.) ! Exsicc.—*Lane Poole*, 227.

12. **S. geophiloides** *Wernham* in Cat. Talb. Nig. Pl. 41.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.* 255.

13. **S. speciosa** *K. Schum.* in Engl. Bot. Jahrb. 23 : 429 ; Wernham Monogr. Sabicea 44. A bristly-hairy climbing shrub with hairy flowers 1½ in. long in lateral fascicles.
Togo (not seen). S. Nigeria : Oban ! Barombi (Nov.) ! Also in French Cameroons. Exsicc.—*Preuss* 150.

14. **S. pilosa** *Hiern*—F.T.A. 3 : 76 ; Wernham Monogr. Sabicea 61. A creeping and climbing plant up to 10 ft. high, flowering on the older shoots which root at the nodes.
S. Nigeria : Barombi ! Extends to Gabon. Exsicc.—*Preuss* 15 ; 278.

15. **S. xanthotricha** *Wernham* in Cat. Talb. Nig. Pl. 42, and l.c. 28. A hairy shrub with leaves sometimes up to 1½ ft. long, and fasciculate flowers over ½ in. long, glabrous outside, borne on the branches.
S. Nigeria : Oban ! Exsicc.—*Talb.* 249 ; 251.

16. **S. Urbaniana** *Wernham* Monogr. Sabicea, 28. Up to 70 ft. high; flowers white, densely fasciculate on the old wood.
Fernando Po: Musola, in low forest (rare) (Nov.)! Exsicc.—*Mildbr.* 7041.

17. **S. discolor** *Stapf* in Journ. Linn. Soc. 37 : 105; Stapf 610; Wernham l.c. 35. *S. loxothyrsus* K. Schum. & Dinkl. ex Stapf 610. *S. discolor* var. *loxothyrsa* Wernham l.c. A climbing shrub, the leaves pale-tomentose below, with pink flowers about ⅓ in. long in short hairy axillary cymes.
Sierra Leone: several localities! Liberia: Gola Forest (Apr.)! Grand Bassa (May)! Sino Basin! Monrovia! Mt. Barclay. Ivory Coast: Bingerville! Bouroukrou! Indenié, Borobo! Gold Coast: Akwapim (Mar.)! Kumasi (Mar.)! Exsicc.—*Murphy* 679. *Whyte.* *Dinklage* 1903. *Aylmer* 31. *Chev.* 15343; 16582; 17664. *Bunting* 28.

18. **S. Johnstonii** *K. Schum.* ex *Wernham* l.c. 66. A climbing shrub with leaves pale-tomentose below and short flowers in compact heads on peduncles 1–2 in. long.
S. Nigeria: Calabar (Mar.)! Cross R. (Jan.-Mar.)! Eket! Exsicc.—*Johnston.* *Holland* 95. *Talb.* (no number).

19. **S. pedicellata** *Wernham* in Cat. Talb. Nig. Pl. 42, and l.c. 67. Like the last but the flowers with woolly and reflexed calyx.
S. Nigeria: Oban! Exsicc.—*Talb.* 1367; 2033.

20. **S. lanuginosa** *Wernham* l.c. 67. A woody climber, with leaves closely pale-tomentose below and rather small pubescent flowers sessile in pedunculate heads.
S. Nigeria: Lagos, Ikoyi (Mar., June)! Iddo (Dec.)! Lagos Colony (Dec.)! Exsicc.—*Millen* 50; 68; 70. *Dalz.* 1199; 1377.

21. **S. capitellata** *Benth.*—F.T.A. 3 : 76; Wernham l.c. 65. *S. brunnea* Wernham l.c. A climbing shrub with rufous-pilose branchlets, leaves pale-rufous below, and white flowers rather few in usually shortly pedunculate hirsute heads.
S. Nigeria: Okuni and Ekom (Jan.)! Ossidinge (Sept.)! Fernando Po (Nov., Dec.)! Cameroons R. (Jan.)! Extends to Congo. Exsicc.—*T. Vogel* 88. *Mann* 41; 2198. *Holl.* 262. *Rudatis* 71.

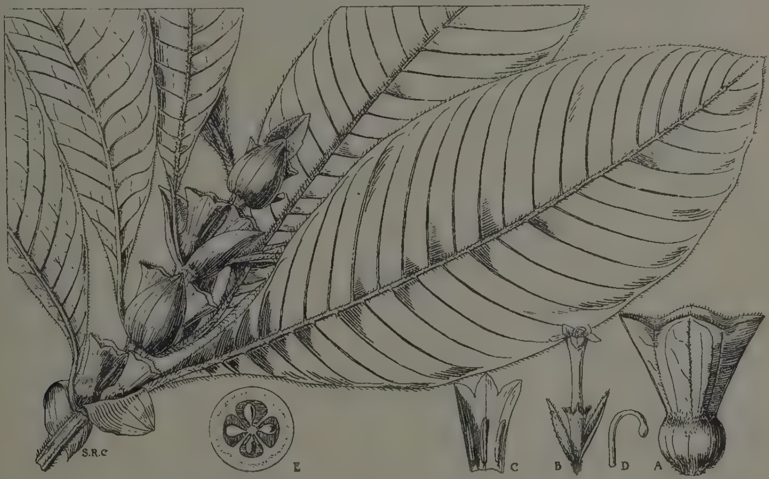

Fig. 207.—Stipularia africana *P. de Beauv.* (Rubiaceae).

A, involucre. B, flower. C, part of corolla laid open. D, part of style and stigma. E, cross-section of ovary.

22. **S. ferruginea** *Benth.*—F.T.A. 3 : 75; Wernham l.c. 60, incl. var. *lasiocalyx* Wernh., partly. A climbing shrub with fairly large leaves rusty-tomentose below, and flowers ⅔ in. long in dense loosely-hairy heads 2 in. across on long peduncles and with bracts 1 in. long.
Sierra Leone: Bagroo R. (Apr.)! Jigaya (Sept.)! Gbanbama! Liberia: Monrovia! Exsicc.—*Don.* *Purdie.* *Mann* 862. *Whyte.*

23. **S. lasiocalyx** *Stapf* in Journ. Linn. Soc. 37 : 106; Stapf 610, partly; *S. ferruginea* var. *lasiocalyx* Wernham l.c. 60, partly. *S. salmonea* A. Chev. Bot. 316. Like the last, the leaves rusty-cinnamon below, with globose very hirsute flower-heads on peduncles usually only 1–1½ in. long.
Liberia: Sino Basin! Kakatown! Dukwia R.! Ivory Coast: Agniéby Valley, Guébo (Feb.)! Attié, Alépé (Feb.–Mar.)! Exsicc.—*Whyte.* *G. P. Cooper* 459. *Linder* 1193. *Chev.* 17031; 17418.

24. **S. arachnoidea** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A rather slender-branched pubescent climber with pale underleaf and subsessile woolly flower-heads ¾ in. in diameter.
Sierra Leone: Yonibana (Nov.)! Roruks (Nov.)! Exsicc.—*N. W. Thomas* 5062; 5275; 5703.

## 39. STIPULARIA P. de Beauv.—F.T.A. 3 : 79.

Stipules oblong-lanceolate, small, about 5 mm. long; leaves broadly lanceolate to obovate, acute, 10–15 cm. long, 4–7 cm. broad, hoary below and with slender distinct lateral nerves; petiole softly pubescent; midrib glabrous on the upper surface; involucre of bracts sessile, campanulate, 2–2·5 cm. long, woolly-pubescent in the upper half .. .. .. .. .. .. .. .. .. 1. *elliptica*

Stipules large and obovate, imbricate, about 8 cm. long; leaves elongate-obovate, about 30 cm. long, 9–10 cm. broad, woolly-tomentose below, with numerous glabrescent lateral nerves ; petiole densely hispid-ciliate ; midrib pilose above, at length glabrous ; involucre of bracts sessile, widely campanulate, 3–4 cm. long, woolly-pubescent in the upper half .. .. .. .. .. .. .. .. 2. *africana*

1. **S. elliptica** *Schweinf.* ex *Hiern*—F.T.A. 3 : 80. A soft-stemmed shrub with quadrangular branchlets, hoary on the young parts and underleaf, and white flowers enclosed in a flask-like involucre of red-tinged bracts 1 in. or more long ; found in wet places.
S. Nigeria : Onitsha ! Also in E. Sudan. Exsicc.—*Barter* 166.

2. **S. africana** *P. de Beauv.* Fl. Owar. 2 : 26, t. 75.—F.T.A. 3 : 80 ; Chev. Bot. 317. A plant of wet places like the last, with often large leaves pale-ochrey below, and red-coloured bracts, stipules and fruits.
Sierra Leone : Luseniya ! Liberia : Duport ! Ivory Coast : Dabou (Feb.). Gold Coast : Awiabo (Nov.) ! S. Nigeria : Lagos, Ikoyi (Jan., Apr.) ! Igbessa (Jan.) ! Eket ! Extends to Congo and Gabon. Exsicc.—*Sc. Elliot* 4077. *Millen* 137. *Dalz.* 1055. *Vigne* 1435. *Talb.* 3292. *Linder* 1482.

## 40. **HUTCHINSONIA** Robyns in Bull. Jard. Bot. Brux. 11 : 24 (1928).

Branchlets covered with long slender spirally twisted hairs ; leaves ovate-oblong or oblong-elliptic, slightly cordate at the base, acuminate, 3·5–6 cm. long, 1·5–2 cm. broad, laxly pilose on both surfaces with setose hairs, with 5–6 pairs of lateral nerves ; stipules linear from a broad base, 3–5 mm. long ; flowers solitary, axillary ; pedicels 3–4 mm. long, setose ; calyx-lobes filiform, 2·5–3 mm. long ; corolla cylindric, tube 2·3 cm. long, lobes ovate, with long ciliate tails ; ovary 3–4-celled .. 1. *barbata*

Branchlets nearly glabrous ; leaves ovate-oblong or oblong-elliptic, slightly cordate at the base, gradually acuminate, 3·5–5·5 cm. long, 1·3–2 cm. broad, glabrous except the midrib and the axils of the nerves ; lateral nerves about 6 pairs ; stipules linear-subulate from a broad base, 5 mm. long, sparingly ciliate ; flowers axillary or terminal ; pedicels 4 mm. long ; calyx-lobes linear, 2·5–3 mm. long ; corolla-tube 2·2 cm. long, lobes narrowly triangular, appendiculate ; ovary 3-celled .. 2. *glabrescens*

1. **H. barbata** *Robyns* l.c. 25, figs. V. and VI. *Vangueria longiflora* Hutch. (name only). A shrub of undergrowth with slender branchlets covered with pale spreading hairs.
Sierra Leone : Kambui Reserve (Feb.) ! Exsicc.—*Lane-Poole* 341.

2. **H. glabrescens** *Robyns* l.c. 28. A vine with slender nearly smooth branchlets and orange flowers.
Liberia : at the mouth of the Sino R. (Dec.). Monrovia (July) ! Exsicc.—*Dinklage* 2144. *Linder* 40.

## 41. **ROBYNSIA** Hutch. in Kew Bull. 1931 : ined.

Branchlets shortly pubescent ; stipules with a long tail about 2 cm. long, the sheath at the base villous within the base ; leaves elliptic, subcordate at the base, acuminate, 10–14 cm. long, 5–6 cm. broad, nearly glabrous below ; lateral nerves about 8 pairs ; petiole up to 1 cm. long, pubescent ; cymes axillary, shortly pedunculate, many-flowered ; bracts linear, 1–1·5 cm. long ; calyx-lobes linear, 1 cm. long, pubescent ; corolla long-tubular, 2 cm. long, pubescent, lobes broadly linear ; style exserted for 1 cm. ; fruit globose .. .. .. .. .. .. .. .. *glabrata*

**R. glabrata** *Hutch.* in Kew Bull. 1931 : ined. A shrub or tree ?
Nigeria : without locality ! Exsicc.—*Kennedy* 177.

## 42. **FADOGIA** Schweinf.—F.T.A. 3 : 152, partly ; Robyns in Bull. Jard. Bot. Brux. 11 : 41 (1928).

Leaves glabrous below except sometimes on the midrib and lateral nerves :
- Branchlets glabrous :
  - Leaves elliptic, ternate, 4–7 cm. long, 2–4 cm. broad, glabrous, with paler conspicuous lateral nerves ; flowers in dense clusters on the previous season's growth ; calyx-lobes oblong-lanceolate, 2·5 mm. long ; corolla 4·5 mm. long, 5–6-lobed ; fruit oblique, 1 cm. long .. .. .. .. .. .. .. 1. *erythrophloea*
  - Leaves oblanceolate, opposite, 4–5 cm. long, about 1·5 cm. broad, closely venose below ; flowers few, in very shortly pedunculate cymes ; calyx-lobes ovate ; corolla 1 cm. long, with acuminate lobes.. .. .. .. 2. *Andersonii*
- Branchlets pubescent ; leaves ternate, obovate-elliptic, abruptly apiculate, subsessile, 6–8 cm. long, 3–4·5 cm. broad, setulose above, at length glabrous, setulose on the midrib below, glaucous-green ; flowers about 3 in shortly pedunculate axillary cymes ; pedicels about 3 mm. long ; calyx-lobes linear-lanceolate ; corolla about 8 mm. long, lobes acuminate ; fruit globose .. .. .. 3. *Pobeguinii*

Leaves pubescent or tomentose more or less all over the lower surface :
- Calyx subulate-dentate :
  - Leaves lanceolate, acute at both ends, 5–6 cm. long, 1–1·5 cm. broad, sparingly setulose above, softly tomentellous below, with 4–5 pairs of lateral nerves ; flowers in small 2–3-flowered cymes .. .. .. .. .. .. .. 4. *rostrata*
  - Leaves obovate or elliptic-obovate, subacute, 3·5–8 cm. long and about 2·5 cm. broad, softly tomentellous below ; flowers about 3 in each axillary cyme ; corolla-lobes sparingly pubescent outside ; fruits globose, hardly 1 cm. diam. 5. *Cienkowskii*
- Calyx with broad ovate-triangular lobes ; leaves obovate, rounded at the apex, subcuneate at the base, 4–8 cm. long, 2–4 cm. broad, densely softly tomentose below ; flowers several in short axillary cymes, tomentose all over ; corolla about 8 mm. long .. .. .. .. .. .. .. .. .. .. 6. *agrestis*

1. **Fadogia erythrophloea** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Vangueria erythrophloea* K. Schum. & K. Krause. *V. Dalzielii* Hutch. *Fadogia djalonensis* A. Chev. ex Robyns. l.c. 88 ; Chev. Bot. 331. A glabrous shrub or small tree, with clusters of green flowers at the nodes mostly below the season's leaves, and green berry-like fruit ½ in. in diameter.

French Sudan : Kobale (Feb.). French Guinea : Kankan (Mar.) ; Labé (Apr.) ; Futa-Jallon, between Ditinn and Labé (Apr.) ; Mamou and Timbo (Dec.). Sierra Leone : ? locality ! Togo : Basari. Dahomey : Atacora Mts., between Farfa and Tonkountouna (June). N. Nigeria : between Zaria and Kano (Feb.) ! Bauchi (Jan.) ! Naraguta ! Extends to N. Cameroons and E. Sudan. Exsicc.—*Sc. Elliot* 5159b. *Dalz.* 379. *Lely* 14 ; 64. *Chev.* 334 ; 572 ; 12307 ; 12881 ; 14639 ; 24069. *Kersting* 539. (See Appendix).

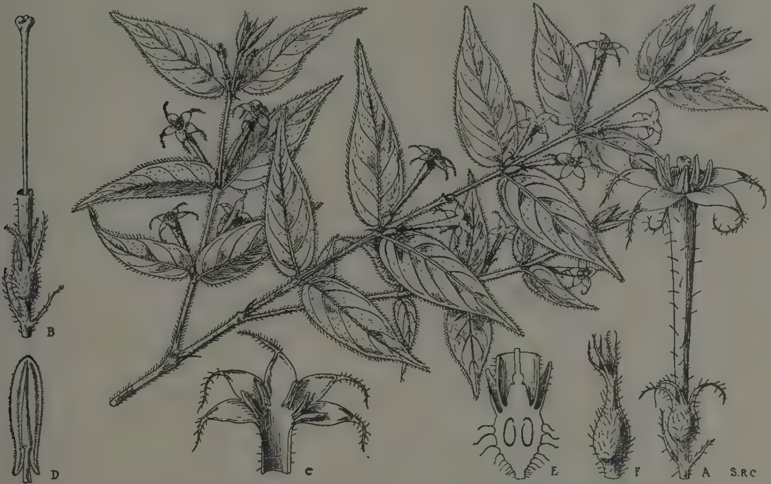

FIG. 208.—HUTCHINSONIA BARBATA *Robyns* (RUBIACEAE).

A, flower. B, same with part of corolla removed. C, upper part of corolla laid open. D, anther. E, longitudinal section of ovary. F, young fruit.

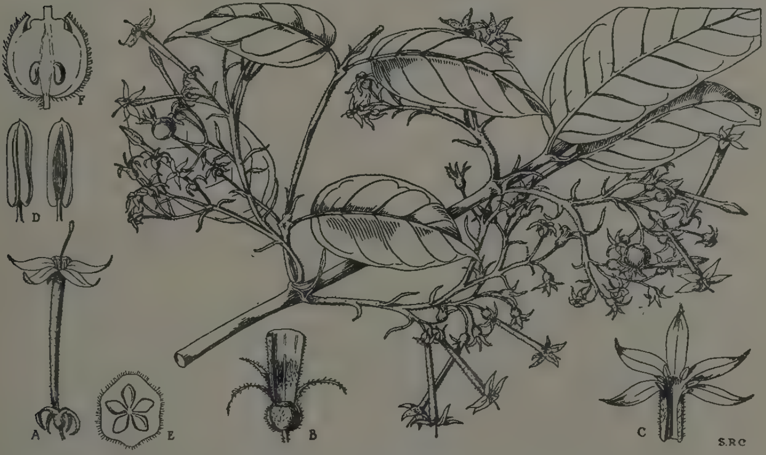

FIG. 209.—ROBYNSIA GLABRATA *Hutch.* (RUBIACEAE).

A, flower. B, lower part of corolla, ovary and calyx. C, upper part of corolla laid open. D, anthers. E, cross-section of ovary. F, longitudinal section of ovary.

2. **F. Andersonii** *Robyns* in Bull. Jard. Bot. Brux. 11 : 86. An undershrub with erect glabrous branches and white flowers in short axillary cymes.

Gold Coast : Volta R. (without precise locality) ! Exsicc.—*Anderson* 43.

3. **F. Pobeguinii** *Pobéguin* in Ess. Fl. Guin. Franç. 316; Robyns l.c. 74. *F. Dalzielii* Robyns l.c. 66. An undershrub with woody base, erect softly-pubescent pithy stems 1–2 ft. high, and yellowish axillary flowers.
French Guinea: Timbo; also ? locality! N. Nigeria: Kontagora (Feb.)! Also in N. Cameroons. Exsicc.—*Farmar* 270. *Dalz.* 218B.

4. **F. rostrata** *Robyns* l.c. 78. Habit of the preceding.
Dahomey: Djougou (May). Atacora Mts., Tomba, 1,200–1,900 ft. (June)! Exsicc.—*Chev.* 23855; 24143.

5. **F. Cienkowskii** *Schweinf.*—F.T.A. 3: 154, partly; Robyns l.c. 79; Chev. Bot. 330. Undershrub with woody base, erect annual stems, tomentose, 1–4 ft. high, and yellowish axillary flowers.
French Sudan: Bambanatoumba (Mar.)! French Guinea: Futa-Jallon (Mar.); Farana (May); Timbo (Nov.); Kankan to Kouroussa. Gold Coast: N. Terr., Karega (Apr.)! Dahomey: Atacora Mts. (June). N. Nigeria: Nupe! Bauchi Plateau, Naraguta (Jan.)! Vom, 3,000–4,500 ft.! Extends to Belgian Congo and E. Africa. Exsicc.—*Barter* 1116. *Lely* P. 25; 48. *Dent Young* 122. *Lloyd-Williams* 147. (See Appendix).

6. **F. agrestis** *Schweinf.*—F.T.A. 3: 154; Robyns l.c. 92; Chev. Bot. 330. An undershrub with yellowish-tomentellous stems 1–2 ft. high from a woody base, and yellow-green flowers in axillary cymes.
French Sudan: Koumantou. French Guinea: Dafila (June); Banko (June). Sierra Leone: Dantilia, near Niger sources (Mar.)! Gold Coast: Ejura! N. Terr., Salaga! Suguri (Apr.)! Togo: Misahöhe (Apr.); Kpandu (Mar.). Dahomey: Abomey (Feb.); Savalou, between Gouka and Bante; Djougou (June). N. Nigeria: Nupe! Zungeru (July)! Bauchi Plateau, Vom, 3,000–4,500 ft.! Nassarawa, Keana (Mar.). Extends to Cameroons and E. Sudan. Exsicc.—*Barter* 1116 (partly). *Sc. Elliot* 5301. *Dalz* 218A. *Dent Young* 121. *Hepburn* 16. *Pomeroy* 1236. *Krause.* (See Appendix).

## 43. RYTIGYNIA Blume Mus. Bot. Lugd. Bat. 1: 178 (1850); Robyns in Bull. Jard. Bot. Brux. 11: 132.

Leaves covered all over the lower surface by a whitish papillous-tomentellous indumentum, ovate-elliptic, narrowly rounded at the base, 7–10 cm. long, 3–4·5 cm. broad, with about 5 pairs of lateral nerves; petiole 3 mm. long; flowers axillary, solitary or paired; pedicels 4–5 mm. long; corolla-tube 3–3·5 mm. long, lobes appendiculate; fruit 6–7 mm. diam. .. .. .. .. 1. *argentea*

Leaves glabrous or hairy only on the nerves below:

Flowers fasciculate on a short simple peduncle, few or subsolitary:

Peduncle longer than the pedicels; flowers in pairs:

Branchlets lenticellate; leaves ovate-elliptic, broadly acuminate, 5–6 cm. long, 2–3 cm. broad, with about 6 pairs of lateral nerves often with tufts of hairs in their axils; petiole 5 mm. long; bracts subulate; corolla-tube 3·5 mm. long, lobes slightly apiculate; fruit obliquely ellipsoid, 1 cm. long .. 2. *senegalensis*

Branchlets thinly tomentose; leaves ovate-lanceolate, broadly acuminate, 3·5–6 cm. long, 1–2·5 cm. broad, discolorous, pubescent on the nerves below; petiole tomentose; corolla-lobes sharply apiculate .. .. .. .. 3. *rhamnoides*

Peduncle shorter than the pedicels:

Pedicels about 7 mm. long:

Midrib glabrous below; branchlets glabrous; leaves oblong-elliptic, broadly acuminate, rounded at the base, 5–8 cm. long, 2–3·5 cm. broad, paler below, with repeatedly looped lateral nerves; bracts ovate-apiculate; calyx denticulate; corolla-tube 5 mm. long .. .. .. .. .. .. 4. *rubra*

Midrib pubescent below; branchlets pubescent when young; leaves oblong-elliptic, obtusely acuminate, narrowly rounded at the base, 6–9 cm. long, 2–3·5 cm. broad, with faintly looped lateral nerves; bracts ovate-triangular; calyx denticulate; corolla-tube 6 mm. long .. .. .. .. 5. *claviflora*

Pedicels much shorter, rarely up to 5 mm. long:

Leaves glabrous on the nerves and lower surface, elliptic, obtusely and abruptly acuminate, subacute at the base, 5–10 cm. long, 3–5 cm. broad, with tufts of short hairs in the axils of the 5 pairs of lateral nerves; corolla-tube 3·5 mm. long 6. *umbellulata*

Leaves pubescent on the nerves or surface below:

Branchlets very thinly pubescent; flowers from the nodes of the one-year-old branchlets; leaves elliptic, broadly long-acuminate, unequally rounded at the base, very thin, 4–6 cm. long, more or less pubescent on the surfaces as well as the nerves; corolla-lobes very acute.. .. .. .. .. 7. *concolor*

Branchlets densely pubescent; flowers in the axils of the leaves on the young shoots; leaves oblong-elliptic, acutely acuminate, more or less rounded at the base, 6–9 cm. long, 2–3·5 cm. broad:

Corolla-bud obtusely pointed, glabrous, tube 5 mm. long; fruit ellipsoid, 8 mm. long .. .. .. .. .. .. .. .. 8. *canthioides*

Corolla-bud acutely apiculate, the limb pilose outside; tube 3 mm. long, broad; fruit obliquely obovoid, 1 cm. long .. .. .. .. 9. *nigerica*

Flowers in short branched cymes, rather numerous; branchlets glabrous; leaves broadly elliptic, obtusely acuminate, subacute at the base, 8–12 cm. long, 3–5 cm. broad, thin and membranous, bright green when dry, with 6–7 pairs of lateral nerves; pedicels nearly 1 cm. long; corolla-tube 3–4 mm. long; branchlets villous at the nodes within the stipules .. .. .. .. .. .. 10. *membranacea*

1. **Rytigynia argentea** *Robyns* in Bull. Jard. Bot. Brux. 11: 205. *Vangueria argentea* Wernham. A shrub, apparently more or less scrambling, with rusty-pubescent branchlets, leaves silvery-grey below, and small single or paired axillary flowers.
S. Nigeria: Oban! Exsicc.—*Talb.* 215.

. **R. senegalensis** *Blume* in Mus. Bot. Lugd. Bat. 1 : 178 ; Robyns l.c. 163, figs. 19 and 20. *Vangueria senegalensis* Benth. & Hook. f. ; Chev. Bot. 330. *V. euonymoides* Hiern—F.T.A. 3 : 150, partly, not of Schweinf. ; Chev. Bot. 330 ; Stapf 612. *Canthium euonymoides* Baill. A glabrous shrub with slender branchlets, more or less scrambling, with elegant foliage and white or greenish-white flowers ¼–¾ in. across, paired on slender axillary peduncles, with reflexed petals.

French Sudan : Gourma. Senegal. French Guinea : between the Kaba and the Upper Mamou ; Kouroussa. Liberia : Grand Bassa. Ivory Coast : Sanvi, between Yaou and Ahiamé ; between Byanouan and Soubiré. Gold Coast : Yeji ! N. Terr., Savelugu and district (May) ! N. Nigeria : Zungeru (July) ! Abinsi (June) ! Extends to E. Sudan. Exsicc.—*Dalz.* 221 ; 757. *Anderson* 23. Kitson 678 ; 962. *Chev.* 12711 ; 17698 ; 17744 ; 24460.

3. **R. rhamnoides** *Robyns* l.c. 207 *Vangueria canthioides* Hiern—F.T.A. 3 : 149, partly, not of Benth. A shrub 12 ft., of slender habit ; flowers greenish-white.

N. Nigeria : Nupe ! Exsicc.—*Barter* 1243.

4. **R. rubra** *Robyns* l.c. 162. *Vangueria euonymoides* Hiern—F.T.A. 3 : 146, partly, not of Schweinf. A climbing shrub very much like the last, with rather larger flowers on shorter peduncles.

S. Nigeria : Lagos, Ikoyi (Mar., Nov.) ! Cameroons Mt., 4,000–5,000 ft. (May) ! Also in French Cameroons and Gabon. Exsicc.—*Dalz.* 1050. *Maitland* 648. (See Appendix).

5. **R. claviflora** *Robyns* l.c. 187. *R. liberica* Robyns l.c. 182. A straggling or climbing shrub, brown-pubescent on the branchlets, with whitish flowers ⅓ in. long 2 or 3 together in the axils.

Liberia : Kakatown ! Gold Coast : Beyin (Nov.)! Exsicc.—*Whyte*. *Vigne* 1470.

6. **R. umbellulata** *Robyns* l.c. 184. *Vangueria umbellulata* Hiern—F.T.A. 3 : 150. A half-climbing shrub, glabrous, with greenish-white flowers ¼ in. long several together in axillary umbels.

Sierra Leone : Sugar Loaf Mt. (Apr.) ! Gold Coast : Kumasi ! Cape Coast. S. Nigeria : Lagos, Ikoyi (Mar.) ! Lagos Colony (Aug.) ! Ijaye ! Ibadan ! Ishagama (Mar.) ! Extends to Angola and N.W. Rhodesia.

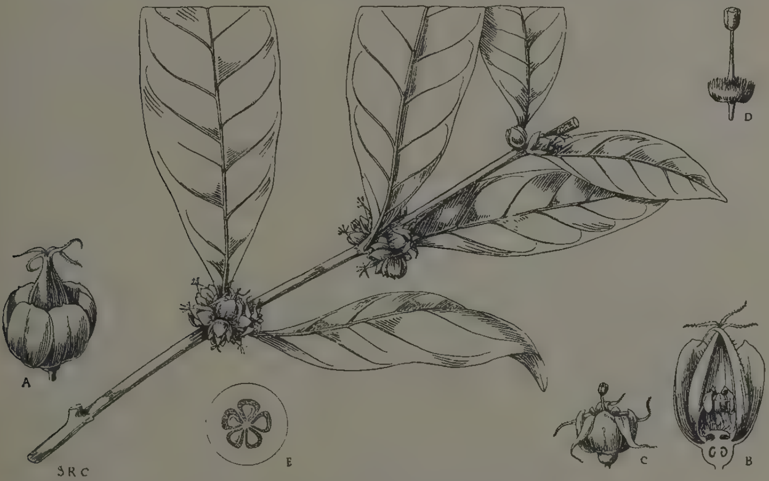

FIG. 210.—GLOBULOSTYLIS TALBOTII *Wernham* (RUBIACEAE).

A, flower. B, same in longitudinal section. C, same with corolla removed. D, style. E, transverse section of ovary.

Exsicc.—*Barter* 3418. *Sc. Elliot* 5780. *Vigne* 950. *Rowland*. *Dalz.* 1050a. *Foster* 213. *Schlechter* 12322. (See Appendix).

7. **R. concolor** *Robyns* l.c. 190. *Vangueria concolor* Hiern—F.T.A. 3 : 150, partly ; Chev. Bot. 330. A shrub or small tree with slender spreading branchlets pubescent on the young parts, with flowers ½ in. long 2–4 together at the nodes.

French Guinea : from Kankan to Kouroussa. Ivory Coast : Middle Sassandra, Guidéko (May). Also in Prince's Island. Exsicc.—*Brossart* in *Herb. Chev.* 15705. *Chev.* 16457.

[illegible]. **R. canthioides** *Robyns* l.c. 188. *Vangueria canthioides* Benth.—F.T.A. 3 : 149, partly. *Canthium Benthamianum* Baill. A small tree or shrub 10–12 ft. high, often scandent, with purplish-brown branchlets rusty-pubescent when young, and yellowish flowers ⅓–½ in. long 2–4 together in small axillary cymes.

Sierra Leone : various localities ! Liberia : Moala-Suen (Nov.) ! Gold Coast : Ashanti, Agogo (Apr.) ! Kumasi (Mar.) ! Exsicc.—*G. Don*. *Mann* 866. *Sc. Elliot* 5710 ; 5889. *Irvine* 959. *Vigne* 1643. *Linder* 1385. (See Appendix).

[illegible]. **R. nigerica** *Robyns* l.c. 208. *Vangueria nigerica* S. Moore. *V. oxyantha* K. Schum., partly. A shrub or low tree, with brownish-pubescent branchlets.

Gold Coast : Accra Plains (July) ! Afram Plains (May) ! S. Nigeria : Lagos ! N. Nigeria : Gurara R., Gomapara ! Exsicc.—*Farmar* 513. *Irvine* 749. *Elliot* 181.

10. **R. membranacea** *Robyns* l.c. 217. *Vangueria membranacea* Hiern—F.T.A. 3 : 151. *Rytigynia viridissima* Robyns. *Canthium viridissimum* Wernham. A shrub or small tree, mostly glabrous, with small flowers in axillary subumbellate cymes.

S. Nigeria : Calabar (Apr.) ! Eket, near Ikotobo ! Exsicc.—*Thomson* 114. *Talb.* 3121.

## 44. GLOBULOSTYLIS Wernham in Cat. Talb. Nig. Pl. 49, t. 9 (1913).

Branchlets glabrous ; leaves oblong-elliptic, subabruptly acuminate, subacute at the base, about 15 cm. long and 6 cm. broad, with 5–6 pairs of lateral nerves, glabrous ;

tertiary nerves few and distant; petiole 0·5–1 cm. long; flowers axillary, subsessile, few; calyx-lobes ovate, leafy, ciliate, about 8 mm. long; corolla sharply keeled in bud, tailed, pilose on the keels; ovary densely tomentose; style hispid in the middle 1. *Talbotii*

Branchlets glabrous; leaves oblong-elliptic, broadly acuminate, up to 12 cm. long and 5 cm. broad, with 6–7 pairs of lateral nerves, glabrous; tertiary nerves very few; petiole 2–4 mm. long; flowers subumbellate on a short peduncle; pedicels 5 mm. long; calyx-lobes broadly ovate, not ciliate, about 8 mm. long; corolla a little longer than the calyx, acute in bud, neither tailed nor pilose; style glabrous 2. *minor*

1. **G. Talbotii** *Wernham* l.c. t. 9. An almost glabrous shrub with flowers less than ½ in. long in short axillary subsessile umbels.
S. Nigeria: Oban! Exsicc.—*Talb.* 2051.

2. **G. minor** *Wernham* l.c. 50.
S. Nigeria: Oban! Exsicc.—*Talb.* 247.

## 45. CANTHIUM Lam.—F.T.A. 3: 132.

Corolla-buds very acute; cymes sessile or subsessile:

Corolla 1–1·3 cm. long; pedicels slender, 8 mm. long, about 6 or more on a short peduncle; leaves elliptic, shortly and broadly acuminate, 9–13 cm. long, 4–6 cm. broad, with about 6 pairs of lateral nerves raised on both surfaces, glabrous 1. *kraussioides*

Corolla up to 7 mm. long:

Petiole 0·5–1 cm. long; veins between the 4–5 pairs of lateral nerves obscure or invisible; leaves broadly elliptic, acuminate, rounded to the acute base, 6–10 cm. long, 3–5 cm. broad, with very prominent sharp nerves below, glabrous; corolla about 7 mm. long .. .. .. .. .. .. .. 2. *acutiflorum*

Petiole very short; veins between the lateral nerves prominent and raised on the upper surface; pedicels elongated and slender in fruit; leaves oblong-elliptic, acuminate, shortly cuneate at the base, 7–10 cm. long, 4–6 cm. broad, glabrous; corolla about 8 mm. long; fruits didymous or obliquely globose, the lobes about 7 mm. diam., black .. .. .. .. .. .. 3. *anomocarpum*

Corolla-buds rounded at the apex; cymes usually pedunculate:

Leaves cordate or subcordate-rounded at the base:

Branchlets, pedicels, ovary and calyx densely rusty-villous outside; leaves cordate at the base, fulvous-hirsute below, oblong-elliptic, acutely triangular-acuminate, 6–12 cm. long, 3–5·5 cm. broad, setulose on the nerves above; lateral nerves 7–8 pairs, very prominent below; cymes many-flowered; corolla-tube very short; stigma large, 2·5 mm. long; young fruits densely villous .. 4. *rufivillosum*

Branchlets, pedicels, etc., not as above, at most rather densely pilose:

Leaves rather long-setose-pilose on the midrib and lateral nerves below, not reddish when dry, broadly elliptic, abruptly acuminate, 15–18 cm. long, 6–9 cm. broad, with 7–10 pairs of lateral nerves prominent on both surfaces; flowers numerous and rather dense; pedicels pilose to nearly glabrous; fruits ellipsoid-globose, 1·5–2 cm. long, glabrous .. .. .. .. .. .. .. 5. *setosum*

Leaves appressed-pubescent on the midrib and nerves below, reddish when dry, ovate-elliptic, shortly acuminate, 12–14 cm. long, 6–7·5 cm. broad, with 6–7 pairs of lateral nerves; petiole 1 cm. long; flowers lax; pedicels minutely pubescent 6. *rubens*

Leaves not cordate at the base, at most broadly truncate or rounded:

* Pedicels glabrous or minutely puberulous:

Flowers in sessile fascicles:

Leaves rounded at the base, broadly obovate-elliptic, caudate-acuminate, 9–13 cm. long; 4–6 cm. broad, hirsute in the axils of the 4–5 pairs of lateral nerves below; petiole 5 mm. long, setulose; pedicels 1 cm. long; calyx truncate with minute ciliolate teeth; corolla-tube 2·5 mm. long .. .. .. .. 7. *favosum*

Leaves acutely cuneate at the base, glossy, oblong-elliptic, gradually acuminate, 6–10 cm. long, 3–4 cm. broad, glabrous; pedicels densely fasciculate, usually only about 2 fruits maturing, these obliquely oblong, 1 cm. long .. 8. *euryoides*

Flowers in pedunculate or sessile cymes:

Flowers densely fasciculate on the often swollen peduncle, the latter about 1 cm. long; bracts and calyx-lobes rather densely pubescent; leaves oblong-elliptic, broadly acuminate, acute at the base, 6–10 cm. long, 3–5 cm. broad, glabrous below:

Pedicels puberulous .. .. .. .. .. .. 9. *Afzelianum*

Pedicels glabrous .. .. .. .. .. .. .. 10. *Kitsonii*

Flowers in lax cymules:

Pedicels 5–8 mm. long:

Cymes pedunculate:

Leaves broadly ovate-rounded, broadly acuminate, unequally rounded at the base, 4–5 cm. long, 2·5–3·5 cm. broad, glabrous; flowers few and small 11. *inaequilaterum*

Leaves broadly oblong-elliptic, broadly and obtusely acuminate, unequal-sided and subacute at the base, 8–12 cm. long, 3–5 cm. broad, glabrous or pubescent on the midrib below ; pedicels glabrous, fruits about 8 mm. long 12. *Heudelotii*

Cymes subsessile .. .. .. .. .. .. .. .. 5. *setosum*

Pedicels about 3 mm. long :

Stipules deciduous ; glabrous within :

Leaves large, ovate or ovate-elliptic, up to 20 cm. long and 15 cm. broad, glabrous or setulose on both surfaces ; flowers very numerous 13. *glabriflorum*

Leaves oblong or oblong-elliptic, acuminate, subrounded at the base, 15–20 cm. long, about 6 cm. broad, subbullate above when dry, with 8–10 pairs of lateral nerves .. .. .. .. .. .. .. 14. *Dunlapii*

Stipules persistent, densely villous within ; leaves small, ovate, 4-7 cm. long, 2·5–3·5 cm. broad, glabrous ; flowers fewer .. .. 15. *Pobeguinii*

**Pedicels fairly long-pubescent or hirsute :

Branchlets glabrous ; pedicels slender, fairly long, rather densely pubescent ; leaves oblong-elliptic, about 12 cm. long and 5 cm. broad, shortly pubescent in the axils of the nerves ; ovary pubescent or glabrous ; calyx-lobes slightly pubescent at the tips ; fruit globose, 1 cm. diam. .. .. .. .. 16. *Mannii*

Branchlets pubescent :

Corolla 5-lobed ; leaves setulose on the upper surface :

Branchlets rather shortly pubescent :

Leaves setose-pubescent mainly on the nerves below, oblong-elliptic, rounded at the base, broadly acuminate, 8·5–11 cm. long, 3·5–5 cm. broad, markedly venose-reticulate below .. .. .. .. .. 17. *venosissimum*

Leaves setose-pubescent over nearly all the lower surface, ovate to oblong, rounded at the base, up to 7 cm. long and 4·5 cm. broad ; pedicels shortly pilose .. .. .. .. .. .. .. .. 18. *Cornelia*

Branchlets long-setose-pilose ; leaves ovate to oblong, sometimes subcordate at the base, up to 11 cm. long and 6 cm. broad ; nerves rather long-pilose-setose below ; pedicels long-pilose .. .. .. .. .. 19. *hispidum*

Corolla 4-lobed ; leaves oblong-elliptic, gradually and obtusely acuminate, about 10 cm. long and 4·5 cm. broad, pilose on the lateral nerves below, with numerous parallel tertiary nerves between ; flowers crowded ; pedicels densely pubescent especially when young ; fruits small, globose, about 7 mm. diam. 20. *venosum*

1. **Canthium kraussioides** *Hiern* in Cat. Welw. Afr. Pl. 1 : 473. *Plectronia kraussioides* K. Schum. A glabrous climbing or scrambling shrub with shining coriaceous leaves, and white or greenish numerous flowers about ½ in. long in short axillary cymes.

   N. Nigeria : Bauchi Plateau (Nov., Jan.) ! Also in Angola. Exsicc.—*Lely* P. 51 ; 719.

2. **C. acutiflorum** *Hiern*—F.T.A. 3 : 136. *Plectronia acutiflora* K. Schum. A climbing shrub, glabrous except on the inflorescence, with small whitish flowers ¼ in. long in axillary umbels.

   S. Nigeria : Calabar ! Oban ! Cameroons Mt., 500 ft. (Feb.) ! Exsicc.—*Mann* 1179. *Thomson* 97. *Kalbreyer* 182.

3. **C. anomocarpum** *DC.*—F.T.A. 3 : 136. *C. caudatiflorum* Hiern. *Plectronia anomocarpa* K. Schum. *P. strychnoides* K. Schum. A glabrous shining shrub more or less scrambling, with whitish flowers ⅓ in. long in axillary umbels, and stalked black berry-like fruits ¼ in. in diameter.

   Senegal and French Sudan to Ivory Coast, fairly common ! Gold Coast : N. Terr., Prang (fr. Jan.) ! Achimota (fr. Mar.) ! Anaje, W. Prov. (Oct.) ! Togo : Badja ! N. Nigeria : Nupe ! S. Nigeria : Iddo (fr. Dec.) ! Ezi (fr. Feb.) ! Also in Shari Region. Exsicc.—*Heudelot* 567. *Barter* 1034 ; 2208. *Sc. Elliot* 3945 ; 3997. *Millen* 45. *Lane-Poole* 395. *Vigne* 1561. *Howes* 975. *Linder* 1219. *Chev.* 2093 ; 3025 ; 3528 ; 12583 ; 14733 ; 17893 ; 19445 ; 22333. *Dinklage* 2035. *Schlechter* 12976. (See Appendix).

4. **C. rufivillosum** *Robyns* MS. A scrambling shrub densely covered with rusty hairs, the flowers ¼ in. long in dense axillary cymes.

   Sierra Leone : Yonibana (Nov.) ! Liberia : Kakatown ! Exsicc.—*N. W. Thomas* 4740 ; 4946. *Whyte.*

5. **C. setosum** *Hiern*—F.T.A. 3 : 141. *Plectronia macrophylla* K. Schum. *P. rubrinervis* K. Krause. A lofty climbing shrub, more or less harshly rusty-pilose on the young stems, becoming glabrous, with flowers ⅓ in. long in dense axillary cymes.

   Sierra Leone : Mabonto (Oct.) ! Yonibana (Oct., Nov.) ! Liberia : Du River, Firestone Plantation No. 3 (Aug.) ! Dukwia River (fr. Apr.) ! S. Nigeria Degema ! Oban ! Calabar ! Cameroons Mt., 2,500 ft. (Dec.) ! Buea (Nov.) ! Exsicc.—*Mann* 1190. *Talb.* 3680. *N. W. Thomas* 3576 ; 3606 ; 4272 ; 4733 ; 5033. *Bequaert. G. P. Cooper* 389. *Deistel* 628.

6. **C. rubens** *Hiern*—F.T.A. 3 : 142. A climbing shrub, rusty-pubescent on the young branchlets, becoming glabrous, with small flowers scarcely ¼ in. long in short paniculate axillary cymes.

   Sierra Leone : Bagroo R. (Apr.) ! Falaba, near Berria (fr. Mar.) ! Exsicc.—*Mann* 818. *Sc. Elliot* 5429.

7. **C. favosum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A straggling or climbing shrub slightly pubescent on the branchlets, becoming glabrous with rather small greenish-white flowers crowded in axillary clusters.

   S. Nigeria : Oban ! Exsicc.—*Talb.* 1284.

8. **C. euryoides** *Bullock* in Kew Bull. 1931 : ined. *C. nitens* Hiern—F.T.A. 3 : 135, not of DC. A glabrous shining shrub with small clustered flowers like the last.

   S. Nigeria : Akassa ! Also in East Africa. Exsicc.—*Barter* 2114.

9. **C. Afzelianum** *Hiern*—F.T.A. 3 : 142 ; *Plectronia Afzeliana* Holl. 3 : 359. A glabrous shining shrub more or less scrambling with small yellowish-white flowers in dense pedunculate axillary cymes.

   Sierra Leone : Kukuna, Scarcies R. (Jan.) ! Wallia (Feb.) ! Mussaia, and Farana (Mar.) ! Kamrabai (Dec.) ! Mano ! Also in E. Sudan. Exsicc.—*Sc. Elliot* 4503 ; 4783 ; 5178. *N. W. Thomas* 6944 ; 7068 ; 10469. (See Appendix).

10. **C. Kitsonii** *S. Moore* in Journ. Bot. 1910 : 220. A shrub like the last, the leaves greyish-green below with small whitish flowers ¼ in. long in very dense cymes.

    S. Nigeria : Western Province, dry zone ! Exsicc.—*Kitson.*

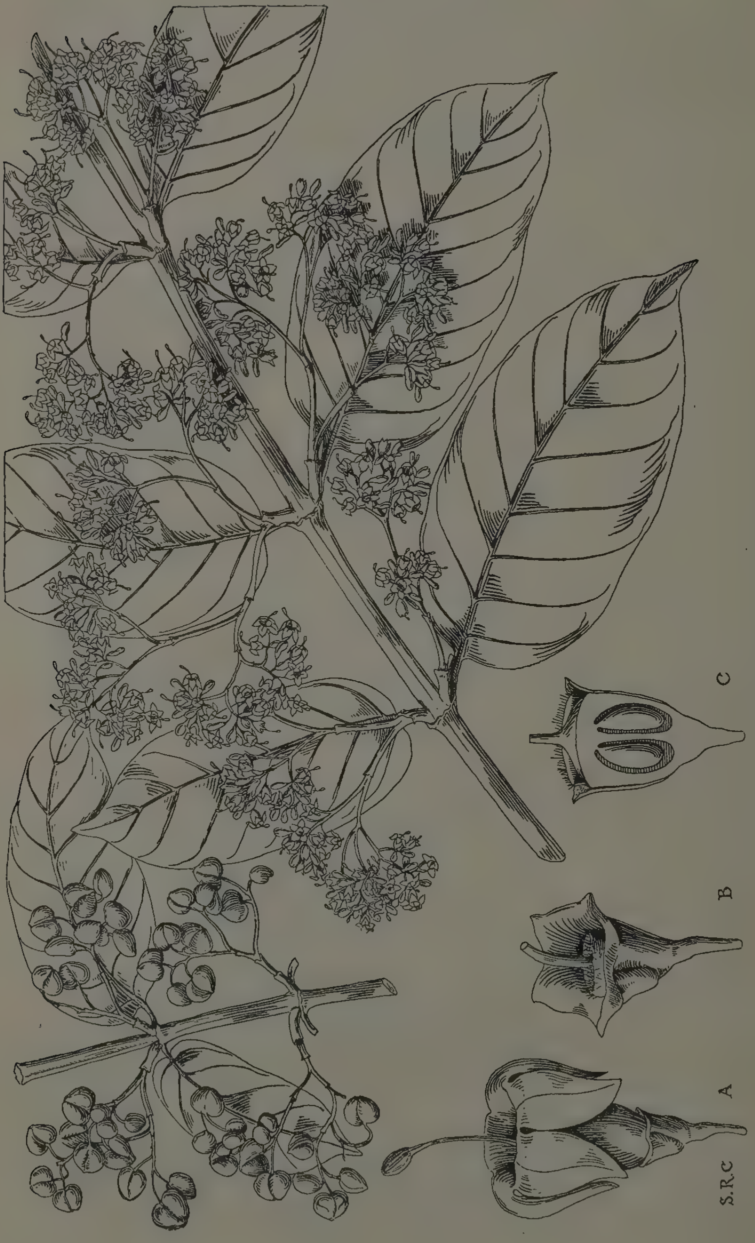

FIG. 211.—CANTHIUM GLABRIFLORUM *Hiern* (RUBIACEAE).
A, flower. B, calyx. C, longitudinal section of ovary.

11. **C. inaequilaterum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A glabrous climbing shrub with ovate leaves and small flowers in loose cymules on short rather slender peduncles.
S. Nigeria : Oban. Exsicc.—*Talb.* 277.

12. **C. Heudelotii** *Hiern*—F.T.A. 3 : 139. *C. ruminatum* Baill. *C. subcordatum* DC. A shrub, more or less scrambling, pubescent on the branchlets, with greenish-white flowers less than ¼ in. long abundant in loose axillary cymes, and subglobose or bilobed berries ¼ in. in diameter.
Senegal ! Gambia : Albreda ! Sierra Leone : Samu country, Kamboa (fr. Jan.) ! Kukuna, Scarcies R. (fr. Jan.) ! Berria, Upper Niger (fr. Mar.) ! Gold Coast : Cape Coast (fr. July) ! Axim ! Accra Plains (Apr.) ! Exsicc.—*Heudelot* 191 ; 653. *T. Vogel* 63. *Sc. Elliot* 4381 ; 4685 ; 5434. *Burton & Cameron. Irvine* 277.

13. **C. glabriflorum** *Hiern*—F.T.A. 3 : 140 ; Chev. Bot. 329. *Plectronia glabriflora* K. Schum. ; Holl. 3 : 359. A small or medium-sized tree with horizontal branches at the crown and sickly-scented small white flowers very numerous in dense dichotomous cymes.
Sierra Leone : various localities ! Gold Coast : Huni Valley (fl. and fr. May) ! Dunkwa (Feb.) ! E. Akim (June) ! Anyinam (fl. and fr. July) ! Juaso ! Dahomey : Savalou, between Banté and Pira (May) ! S. Nigeria : several localities ! Also in Cameroons, Portuguese Congo and St. Thomas Island. Exsicc.—*Thomson* 112. *Johnson* 736. *Aylmer* 267. *Chipp* 218. *Brent* 406. *Dalz.* 159. *Millen* 188. *Dennett* 41. *Sankey* 21. *Talb.* 3041. *Chev.* 23743. (See Appendix).

14. **C. Dunlapii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A medium-sized tree with glabrous branchlets and small white flowers in axillary cymes 1–2 in. long ; fruit about ½ in. long, oblique.
Cameroons Mt., Buea (Dec.–Mar.) ! Exsicc.—*Dunlap* 93. *Maitland* 239 ; 508 ; 795.

15. **C. Pobeguinii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with nearly glabrous branchlets, leaves rather pale beneath, and small white flowers in short branched axillary cymes.
French Guinea : Kouroussa (Apr., May) ! Exsicc.—*Pobéguin* 229 ; 240.

16. **C. Mannii** *Hiern*—F.T.A. 3 : 143. *Plectronia flaviflora* K. Schum. An erect shrub 15–20 ft. high or more or less scrambling, with small white flowers numerous in dense branched rather compact cymes.
Sierra Leone : Bagroo R. (Apr.) ! Mano ! S. Nigeria : Lagos Colony ! Johann-Albrechtshöhe ! Cameroons R. (Jan.) ! Victoria ! Also in French Cameroons. Exsicc.—*Mann* 742. *Rowland. Staudt* 511. *Maitland* 974.

17. **C. venosissimum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A scrambling or climbing shrub, or sometimes a tree, with pubescent branchlets, leaves pale and reticulate below, small white flowers numerous in short axillary cymes and oblique fruits ⅜ in. long.
Liberia : Du River (fr. Aug.) ! Gold Coast : Kumasi (Sept.) ! Exsicc.—*Vigne* 1336. *Linder* 267.

18. **C. Cornelia** *Cham. & Schl.*—F.T.A. 3 : 140 ; Chev. Bot. 328. A scrambling shrub more or less rusty-pubescent on all parts, with small cream-white flowers crowded in subglobose pedunculate cymes in the axils.
French Sudan : Upper Volta, Samandini ; Sébi, Upper Niger. Senegal ! Gambia ! Sierra Leone : Dantilia, Upper Niger (Mar.) ! Mabonto (Oct.) ! Gold Coast : N. Terr., several localities ! Exsicc.—*Roger. Sieber. Sc. Elliot* 5296. *Hayes* 555. *Kitson* 677 ; 679 ; 717. *Pomeroy* 1234. (See Appendix).

19. **C. hispidum** *Benth.*—F.T.A. 3 : 140 ; Chev. Bot. 329. A scrambling or climbing shrub rusty-hirsute on all parts, with small white flowers crowded in axillary pedunculate cymes, and black globose or bilobed fruits ¼–⅓ in. in diameter.
Sierra Leone : Freetown ! Gbangbama ! Liberia : Dukwia R. (fr. Mar.) ! Banga (Oct.) ! Ivory Coast : Bingerville ; Assinié ; Sassandra Port. Gold Coast : Axim (Dec.) ! Essiama (Nov.) ! Kumasi (fr. Jan.) ! Nsuta (May) ! Aburi Hills (Mar.) ! Togo : Lome ! S. Nigeria : Lagos, Ikoyi ! Lagos Colony (Aug.) ! Exsicc.—*G. Don. Barter* 2182. *Rowland. Millen* 146. *Brown* 683. *Johnson* 945. *G. P. Cooper* 309. *Linder* 1168. *Warnecke* 433. (See Appendix).

20. **C. venosum** *Hiern*—F.T.A. 3 : 144. *Plectronia venosa* Oliv. *C. Barteri* Hiern. *Plectronia Barteri* De Wild. & Th. Dur. A shrub or small tree of more or less straggling habit or a woody climber, rusty-tomentose on the young parts, usually becoming glabrous, with greenish-white or creamy flowers numerous in dense shortly pedunculate branched cymes.
French Sudan : Oualia (fr. Dec.) ! French Guinea : Beyla (July) ! Kouria ! Sierra Leone : Bafodeya, Limba (fl. and fr. Apr.) ! Bulumba (fr. Sept.) ! Liberia : Dukwia R. (fr. May) ! Gold Coast : New Juaben (Mar.) ! N. Nigeria : Atakati, Bassa (June) ! Abinsi (Aug.) ! S. Nigeria : Lagos ! Onitsha ! Asaba ! Ila (Oct.) ! Ezi (fr. Feb.) ! Aguku ! Oban ! Brass ! Extends to Congo, E. Sudan and E. Africa. Exsicc.—*Barter* 285 ; 403 ; 1800. *Sc. Elliot* 5552. *Johnson* 633. *Dawodu* 220. *Elliott* 235. *Dalz.* 647 ; 768. *Collenette* 70. *G. P. Cooper* 448. *Pobéguin* 282. *Chev.* 103 ; 15073 ; 18380. (See Appendix).

## 46. CRATERISPERMUM Benth.—F.T.A. 3 160.

Anthers well exserted from the corolla-tube on long filaments :
  Leaves very shortly and abruptly pointed, yellowish when dry, closely reticulate below, oblong-obovate, up to 20 cm. long and 7 cm. broad ; lateral nerves about 8 pairs ; calyx cupular, truncate ; lobes and throat of corolla pubescent inside ; fruits shortly stalked.. .. .. .. .. .. .. .. .. 1. *laurinum*
  Leaves distinctly rather long-acuminate :
    Inflorescence pedunculate, with shortly acute bracts :
      Fruits subsessile on the peduncle ; leaves elongate oblong-obovate, acute at the base, 10–15 cm. long, 3·5–6 cm. broad, rather thin, laxly venose below ; lateral nerves 8–10 pairs ; calyx toothed ; lobes and throat of corolla slightly pubescent 2. *cerinanthum*
      Fruits long-pedicellate on the peduncle, 3 mm. diam. ; leaves oblong or oblong-elliptic, shortly cuneate at the base, caudate-acuminate, 8–14 cm. long, 2·5–4·5 cm. broad, finely reticulate on both sides ; lateral nerves spreading almost at right angles ; peduncle about 6 mm. long ; calyx denticulate 3. *caudatum*
    Inflorescence subsessile, with long aristate bracts ; leaves broadly oblong-elliptic, broadly acuminate, acute at the base, 15–20 cm. long, 6–9 cm. broad, laxly reticulate below ; lateral nerves about 7 pairs, branched towards the margin 4. *aristatum*
Anthers half-exserted on very short filaments :
  Leaves oblong-oblanceolate, shortly acuminate, cuneate at the base, about 10 cm. long and 4 cm. broad, with 6–7 pairs of much-branched lateral nerves ; peduncle 1 cm. long, flattened ; corolla 6–7 mm. long .. .. .. .. 5. *brachynematum*
  Leaves narrowly oblong-lanceolate, gradually and broadly acuminate, about 6 cm. long

and 2 cm. broad, glabrous ; lateral nerves about 5 pairs ; peduncle about 3 mm. long, flattened ; corolla about 6 mm. long .. .. .. .. 6. *gracile*

1. **Craterispermum laurinum** *Benth.*—F.T.A. 3 : 160 ; Stapf 612 ; Holl. 3 : 361 ; Chev. Bot. 332. A glabrous shrub or small tree up to 20 ft. high with yellow-green coriaceous leaves and white tubular waxy flowers ¼ in. long in peduncled axillary clusters.
   Senegal ! French Guinea : between the Konkouré and Timbo. Sierra Leone : common ! Liberia : Monrovia ! Kakatown ! Gbanga (Sept.) ! Togo : Amedzofwe (Feb.) ! N. Nigeria : Bauchi Plateau (Jan.) ! Also in E. Africa. Exsicc.—*Heudelot* 908. *T. Vogel* 187. *Mann* 808. *Sc. Elliot* 4604 ; 4606 ; 5260. *Smythe* 264. *Whyte*. *Irvine* 179. *Lely* P. 47. *Linder* 575. (See Appendix).
2. **C. cerinanthum** *Hiern*—F.T.A. 3 : 161. A shrub like the last with white or pinkish flowers ⅓ in. long.
   Gold Coast : Aburi Hills (Feb.–Apr., Nov.) ! Akenkoso, Centr. Prov. (Feb.) ! S. Nigeria : Lagos, Ebute Metta, Yaba, etc. (Mar.) ! Eket ! Oban ! Johann-Albrechtshöhe ! Also in Prince's Island. Exsicc.—*Barter* 2175. *Moloney*. *Brown* 392. *Johnson* 292 ; 886 ; 940 ; 960. *Dalz*. 1204 ; 1378. *Talb*. 2067. *Staudt* 569.
3. **C. caudatum** *Hutch.* in Kew Bull. 1920 : 23. *C. montanum* K. Schum. in Engl. Bot. Jahrb. 23 : 460, partly, not of Hiern. A small tree with green glabrous branchlets and white flowers ¼ in. long.
   Sierra Leone : Bandajuma (May) ! Talla Hills, Likuru (Feb.) ! Kenema (Jan.) ! Liberia : Gbanga (Sept.) ! Exsicc.—*Aylmer* 78. *Sc. Elliot* 4987. *N. W. Thomas* 7857 ; 7891 ; 7946. *Linder* 713.
4. **C. aristatum** *Wernham* in Cat. Talb. Nig. Pl. 51. A glabrous shrub with rather large leaves and white flowers ⅓ in. long in dense almost head-like axillary cymes.
   S. Nigeria : Oban ! Exsicc.—*Talb*. 251.
5. **C. brachynematum** *Hiern*—F.T.A. 3 : 161. A shrub with yellow-green leaves and small white flowers ¼ in. long in pedunculate axillary clusters.
   S. Nigeria : Calabar ! Exsicc.—*Thomson* 33.
6. **C. gracile** *A. Chev.* Bot. 332, name only. Shrub 10–15 ft. high ; flowers white ; fruit small, dark blue.
   Ivory Coast : Bouroukrou, in the forest (Jan.) ! Exsicc.—*Chev*. 17017.

## 47. VANGUERIOPSIS Robyns in Bull. Jard. Bot. Brux. 11 : 248 (1928).

Calyx-lobes short and broad, more or less contiguous at the base :

Corolla glabrous outside or at most shortly puberulous :

Young branches glabrous :

Petiole about 1 cm. long ; leaves broadly oblong-elliptic, abruptly long-acuminate, rounded at the base, 10–15 cm. long, 5–7 cm. broad, with 6–7 pairs of lateral nerves ; pedicels and ovary glabrous, calyx-lobes 1 mm. long 1. *chlorantha*

Petiole 4–5 mm. long ; leaves obovate-elliptic, shortly abruptly acuminate, 10–14 cm. long, 4·5–7 cm. broad, leathery, with about 5 pairs of lateral nerves ; pedicels and ovary puberulous ; calyx-lobes suborbicular, conspicuous 2. *calycophila*

Young branches pubescent or tomentose ; branchlets often spiny ; leaves much paler below, broadly elliptic, abruptly and obtusely acuminate, 6–10 cm. long, 3–4 cm. broad, puberulous on the nerves below ; cymes many-flowered ; calyx-lobes broadly ovate, small ; corolla 5 mm. long ; fruit very oblique, 1·5 cm. long 3. *discolor*

Corolla tomentose outside :

Corolla-buds with long subulate apices ; leaves ovate-elliptic, acutely acuminate, rounded at the base, 6–12 cm. long, 3·5–7 cm. broad, pubescent on the nerves below ; veinlets very close and parallel below ; fruit mostly kidney-shaped, 2·5–3 cm. long .. .. .. .. .. .. .. 4. *vanguerioides*

Corolla-buds not apiculate or very shortly so ; leaves ovate-elliptic to lanceolate, shortly acuminate, more or less rounded at the base, 8–15 cm. long, 4·5–7 cm. broad, shortly pubescent on the nerves and veins below, the latter close and fine ; cymes laxly few-flowered, with rather large persistent bracts and broad calyx-lobes ; fruit about 2·5 cm. long, 1–2-seeded .. .. .. .. 5. *nigerica*

Calyx-lobes elongate and linear, or short and subulate, separated at the base :

Young branches and inflorescence glabrous ; branchlets often spiny, with pale bark ; leaves broadly elliptic to obovate, acutely acuminate, rounded and subcordate to acute at the base, up to 12 cm. long and 7 cm. broad, very thin, glabrous ; inflorescence slender, laxly dichotomous ; corolla 1 cm. long ; fruits obliquely ellipsoid or bilobed, 1·5 cm. long.. .. .. .. .. .. .. 6. *leucodermis*

Young branches pubescent or setose :

Leaves ovate-oblong or elliptic, never over 5·5 cm. broad, caudate-acuminate, very thin, rather densely pilose on both surfaces ; branchlets with curved sharp spines ; cymes subracemose, long-pilose ; pedicels slender, about 5 mm. long ; upper part of corolla long-pilose .. .. .. .. .. .. 7. *subulata*

Leaves broadly ovate-rounded up to 8·5 cm. long and 6·5–7 cm. broad, abruptly and shortly acuminate, shortly pilose on the nerves below ; petiole pilose-pubescent ; branchlets grey, with rather long spines ; cymes subracemose, shortly pilose ; pedicels 3 mm. long ; corolla-lobes very thinly pilose .. .. .. 8. *violacea*

1. **Vangueriopsis chlorantha** *Robyns* in Bull. Jard. Bot. Brux. 11 : 255. *Plectronia chlorantha* K. Schum. A glabrous shrub 6–10 ft. high with smooth greenish branchlets, pale glaucous leaves, and small greenish-white flowers ¼ in. long in short but lax axillary cymes ; fruit a drupe ¾ in. long.
   S. Nigeria : Oban ! Also common in Cameroons. Exsicc.—*Talb*. 1549 ; 1653.
2. **V. calycophila** *Robyns* l.c. 256. *Plectronia calycophila* K. Schum. Erect or scandent glabrous shrub, the leaves grey-brown below, with greenish flowers few in short loose cymes.
   S. Nigeria : Oban ! Also common in Cameroons. Exsicc.—*Talb*. 1657.
3. **V. discolor** *Robyns* l.c. 264. *Canthium discolor* Benth.—F.T.A. 3 : 264 ; Chev. Bot. 329. Shrub or small tree, often spiny, the young branchlets rusty-pubescent, with leaves pale below, and greenish flowers in short branched cymes often at the nodes below the leaves.

Senegal ! French Guinea : Kouroussa (Mar.) ! Ditinn (Apr.) ! Faranna and Musaiya (Mar.) ! Timbo to Faranna (Apr.) ! Kankan-Kouroussa ! Sierra Leone : various localities ! Liberia : Dukwia R. (May) ! Ivory Coast : Upper Cavally, Guerzé country, between Kouanhule and Danane (Apr.). Exsicc.—*Heudelot* 802. *Don.* *T. Vogel* 81. *Mann* 878. *Sc. Elliot* 4984 ; 5135. *Smythe* 52. *Chev.* 12993 ; 12994 ; 13331 ; 13521 (ter) ; 15632. *Pobéguin* 664. *G. P. Cooper* 425. (See Appendix).

4. **V. vanguerioides** *Robyns* l.c. 260. *Canthium vanguerioides* Hiern—F.T.A. 3 : 260, partly ; Chev. Bot. 329. *Plectronia vanguerioides* K. Schum. Shrub or tree up to 25 ft. or more high, the branchlets brown-tomentose when young, with greenish flowers in short branched cymes mostly at the nodes below the leaves.

French Guinea : between the Kaba and the Upper Mamou (Apr.) ! Futa-Jallon, Kouria ! Sierra Leone : Sugarloaf Mountain, near the summit (Mar., Apr.) ! Heddle's Farm (June) ! Kenema (May) ! Ivory Coast : Upper Sassandra, Dyola country, Mt. Boho (May) ! Gold Coast : Kwahu Tafo (Apr.) ! Nabuingo (May) ! Togo : near Kama, and Misahöhe. Dahomey : Savalou (May). Exsicc.—*Barter* (no number). *Sc. Elliot* 5776. *Dalz.* 969. *Lane-Poole* 263 ; 280. *Kitson* 675 ; 733 ; 1062. *N. W. Thomas* 521 ; 744 ; 1125. *Chev.* 21462. (See Appendix).

5. **V. nigerica** *Robyns* l.c. 261, figs. 25 and 26. *Canthium vanguerioides* Hiern—F.T.A. 3 : 260, partly ; *Vangueriopsis lanceolata* Robyns. A fairly tall tree, sometimes a shrub of 10 ft., brown-pilose on the young branchlets, with greenish flowers in lax racemose cymes mostly at the older nodes.

N. Nigeria : Lokoja (June) ! Abinsi, in ravine between Waratabra and Makeri (June) ! S. Nigeria : Abeokuta ! Lagos Colony ! Olokemeji ! Idah ! Niger R. ? locality ! Also in Cameroons. Exsicc.—*Barter* 1251. *Baikie.* *Irving* 155. *Rowland.* *Elliott* 229. *Foster* 98. *Dalz.* 756. *Macgregor* 282.

6. **V. leucodermis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Chomelia leucodermis* K. Krause. *V. membranacea* Robyns l.c. 271. A glabrous shrub or small bushy tree, the branchlets with stout curved supra-axillary spines, with greenish yellow flowers in axillary branched cymes.

Gold Coast : Accra Plains (Apr.) ! Agogo (Apr.) ! Togo : Lome ! Basari, in fringing forest (fr. June) ! S. Nigeria : Oloke Meji ! Lagos Colony ! Exsicc.—*Foster* 279. *Rowland.* *Irvine* 148 ; 207 ; 960. *Warnecke* 349. *Kersting* 69.

7. **V. subulata** *Robyns* l.c. 268. *V. setosa* Robyns. A scrambling or climbing shrub with curved spines and whitish flowers in small axillary cymes.

Sierra Leone : Falaba, near Berria (Mar.) ! S. Nigeria : Oban ! Degema ! Also in Cameroons. Exsicc.—*Talb.* 1688. *Sc. Elliot* 5400.

8. **V. violacea** *Robyns* l.c. 270. A climbing shrub with supra-axillary spines, the young branchlets black-purple and setose-pilose, with greenish-yellow flowers in copious branched cymes on short lateral branches.

Togo : Kpandu (Feb.). Exsicc.—*Robertson* 108.

## 48. VANGUERIA Juss.—F.T.A. 3 : 146, partly ; Robyns in Bull. Jard. Bot. Brux. 11 : 273 (1928).

Inflorescence glabrous or nearly so ; flowers sessile or subsessile ; corolla villous at the throat, tube 3–4 mm. long, lobes ovate, acute ; leaves deciduous, ovate-oblong, narrowed at the base, gradually acuminate, 7–15 cm. long, 3·5–7 cm. broad, with 8–12 pairs of lateral nerves, glabrous ; fruit stalked, globose, slightly ribbed, 1·5–2·5 cm. diam., mostly 5-seeded .. .. .. .. .. .. 1. *venosa*

Inflorescence pilose ; flowers pedicellate ; corolla long-villous at the throat, tube 3 mm. long, lobes ovate, obtuse, pilose outside ; leaves ovate, rounded at the base, rather obtuse at the apex, 3–5 cm. long, 1·5–3 cm. broad, with 5–7 pairs of lateral nerves ; fruit globose, subsessile, about 1 cm. diam., slightly pubescent, 5-seeded 2. *Kerstingii*

1. **V. venosa** *Hochst.* ex *A. Rich.* Tent. Fl. Abyss. 1 : 353. *V. edulis* Hiern—F.T.A. 3 : 148, not of Vahl. A shrub or small tree glabrous in most parts, with greenish flowers in branched cymes usually on the young leafy shoots.

S. Nigeria : Abo ! Idah ! Extends to Abyssinia and E. Africa, and south to Gazaland. Exsicc.—*Barter* 362 ; 1250.

2. **V. Kerstingii** *Robyns* in Bull. Jard. Bot. Brux. 11 : 305. A shrub with red-brown striate branchlets desquamating with age, the flowers $\frac{1}{4}$ in. long in short pilose cymes at the nodes.

Togo : Basari ! Exsicc.—*Kersting* 620.

## 49. CUVIERA DC.—F.T.A. 3 : 156.

Style pubescent ; ovary 5-celled :

Leaves elongate-oblong, about 30 cm. long and 10 cm. broad, subcordate at the base, with about 10 pairs of lateral nerves ; cymes distinctly pedunculate, about 7 cm. long ; bracts linear-lanceolate, 3–4 cm. long, 0·5 cm. broad ; corolla 2 cm. long, lobes keeled, acutely acuminate .. .. .. .. .. 1. *longiflora*

Leaves oblong or narrowly oblong, cuneate to narrowly rounded at the base, 18–20 cm. long, 3–6 cm. broad, with 6–8 pairs of lateral nerves ; cymes branched from the base, about 7 cm. long ; flowers pedicellate ; bracts almost filiform ; corolla 2 cm. long, lobes not keeled with long filiform tails ; fruits ribbed, 4·5 cm. long 2. *macroura*

Style glabrous :

Ovary 5-celled :

Calyx divided into lanceolate-linear segments :

Bracts elongate-linear, 2–2·5 cm. long, much longer than the calyx-lobes ; leaves thin, oblong-elliptic, rounded and very unequal-sided at the base, about 20–25 cm. long and 8 cm. broad ; corolla angular in bud, with long slender-tailed lobes 3. *subuliflora*

Bracts oblanceolate, about as long as and very similar to the calyx-lobes, up to about 1·5 cm. long ; leaves firm, oblong, rounded and subequal-sided at the base, averaging about 15 cm. long and 6 cm. broad, paler below ; corolla slightly ribbed, apiculate .. .. .. .. .. .. .. .. 4. *acutiflora*

Calyx truncate ; bracts narrowly oblanceolate, about 3·5–4 cm. long ; corolla narrowly ovoid, very acute, lobes triangular-lanceolate, about 1 cm. long ; inflorescence large and divaricate ; leaves oblong-elliptic, about 25 cm. long and 10 cm. broad, with about 7 pairs of lateral nerves .. .. .. .. .. 5. *truncata*

Calyx-lobes narrowly oblong-elliptic, not acuminate, about 8 mm. long ; corolla-lobes with long filiform tails, pilose outside .. .. .. 6. *nigrescens*

Calyx-lobes narrowly lanceolate, gradually long-acuminate ; corolla-shorter than the calyx, lobes with long filiform tails ; fruits ellipsoid-globose, 1·5 cm. diam. 7. *calycosa*

Ovary 3-celled ; leaves oblong or oblong-elliptic, broadly acuminate, rounded at the base, about 15 cm. long and 5 cm. broad, with about 8 pairs of lateral nerves ; petiole 1 cm. long ; flowers few in a small cyme ; calyx-lobes spathulate, 1 cm. long ; fruit obliquely ellipsoid, ribbed, 3 cm. long .. .. .. .. 8. *trilocularis*

1. **Cuviera longiflora** *Hiern*—F.T.A. 3 : 157. A glabrous shrub or tree 25 ft. high, with rather large long leaves, flowers and whitish bracts 1–1½ in. long or more in axillary cymes ; the branches near the nodes are sometimes swollen and hollow, used as ant habitations.
Cameroons Mt., 2,000–3,000 ft. (Jan.) ! Exsicc.—*Mann* 1211.

2. **C. macroura** *K. Schum.* in Engl. Bot. Jahrb. 33 : 352. *C. subuliflora* A. Chev. Bot. 331, not of Benth. A glabrous shrub or small tree 15 ft. high, with whitish flowers ¾ in. long including the tailed corolla-lobes crowded in short axillary cymes ; the stipules and sometimes the swollen internodes harbour ants.
Sierra Leone : Binkolo (Aug.) ! Bumbuna (Oct.) ! Kumrabai (Dec.) ! Liberia : Peahta on St. Paul R. (fl. and fr. Oct.) ! Ivory Coast : various localities ! Gold Coast : Kumasi (fr. June) ! S. Nigeria : Lagos ! Degema ! Exsicc.—*Millen* 159. *Talb.* 3632. *N. W. Thomas* 1857 ; 3189 ; 6914. *Vigne* 181 ; 1758. *Bequaert. Chev.* 19869 ; 19921. *Linder* 1035.

3. **C. subuliflora** *Benth.*—F.T.A. 3 : 157. *C. plagiophylla* K. Schum. A glabrous shrub 15–20 ft. high with rather long leaves, and greenish-white or yellowish fragrant flowers ½ in. or more long with pale narrow calyx-lobes and bracts, in paniculate cymes.
S. Nigeria : Lower Niger, Ibo country (Aug.) ! Oban ! Degema ! Victoria ! Fernando Po ! Also in Cameroons. Exsicc.—*T. Vogel* 2 ; 83. *Talb.* 222 ; 3383. *Mann* 87. *Maitland* 417 ; 740.

4. **C. acutiflora** *DC.*—F.T.A. 3 : 156 ; Chev. Bot. 331. Habit of the preceding, with shining coriaceous leaves and conspicuous pale bracts and calyx-lobes.
Common from Sierra Leone to N. and S. Nigeria. Also in Cameroons. Exsicc.—*Don. Whitfield. T. Vogel* 72 ; 770. *Sc. Elliot* 3898b ; 4755 ; 4876. *Millen* 68. *Whyte. Elliott* 198. *Linder* 1539. *Kalbreyer* 29.

5. **C. truncata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *C. subuliflora* Wernham in Cat. Talb. Nig. Pl. 131, not of Benth. A shrub like the two preceding, with rather large shining coriaceous leaves and conspicuous pale bracts.
S. Nigeria : Degema ! Oban ! Exsicc.—*Talb.* 286 ; 3686.

6. **C. nigrescens** *Wernham* in Journ. Bot. 1911 : 321. *Vangueria nigrescens* Scott Elliot—Hook. Ic. Pl. t. 2283. *Cuviera minor* C. H. Wright. *C. trichostephana* K. Schum. A nearly glabrous shrub or small tree, sometimes straggling, with fragrant white flowers ¾ in. long fairly numerous in short lax cymes at the nodes ; turning blackish in drying.
Sierra Leone : Limba, Kafogo (Apr.) ! Falaba (Mar.) ! York Pass (June) ! S. Prov., Vevehun (Apr.) ! Gold Coast : Kwahu (Apr.) ! Kumasi (Apr.) ! S. Nigeria : Lagos Colony ! Exsicc.—*Sc. Elliot* 5610 ; 5736. *Johnson* 646. *Foster* 73. *Vigne* 1113 ; 1675 ; 1712 ; 1834.

7. **C. calycosa** *Wernham* in Journ. Bot. 1914 : 7. A nearly glabrous shrub resembling the last but the flowers with a much larger calyx and smaller corolla, the latter white turning to yellow.
S. Nigeria : Eket, Esuk Ekkpo Abassi ! Exsicc.—*Talb.* 3300.

8. **C. trilocularis** *Hiern*—F.T.A. 3 : 157. A small glabrous tree with greenish-white flowers ½ in. long few in axillary cymes.
S. Nigeria : Calabar ! Oban ! Exsicc.—*Thomson* 122. *Talb.* 221.

*Imperfectly Known Species.*

**C. djalonensis** *A. Chev.* Bot. 331, name only.
French Guinea : various localities ! Exsicc.—*Chev.* 12417 ; 12496 ; 14821 bis ; 15628.

## 50. TEMNOCALYX Robyns in Bull. Jard. Bot. Brux. 11 : 317 (1928).

Branches glabrous, with rather long internodes ; leaves in whorls of three, obovate, shortly and bluntly pointed, 3–5 cm. long, 2–3 cm. broad, glabrous, with about 4 pairs of lateral nerves ; flowers supra-axillary, paired ; pedicels 1 cm. long ; calyx truncate, rim-like ; corolla-tube curved, 1·5–2 cm. long ; anthers partly exserted ; stigma long-exserted, short and cylindric-capitate ; ovary 5-celled ; fruit globose *obovatus*

**T. obovatus** *Robyns* l.c. 320, figs. 31, 32. *Fadogia obovata* N.E.Br. A low shrub sometimes in clumps, with 3-angled slightly pubescent stems and axillary single or paired flowers ¾–1 in. long, the corolla greenish-yellow with white lobes.
N. Nigeria : between Tegina and Ufaka (June) ! Bauchi Plateau, Naraguta (June) ! Extends in savannah regions to E. Africa and south to S. Rhodesia. Exsicc.—*Dalz.* 554. *Lely* 326.

## 51. MORINDA Vaill.—F.T.A. 3 : 191 ; Hutch. in Kew Bull. 1916 : 8, with figs.

Climbing shrubs ; peduncles terminal or terminating short lateral branchlets, never leaf-opposed ; flowers 6–7-merous :

Peduncles in pairs ; corolla-tube elongated, slender, 4–8 cm. long, densely villous or pubescent in the throat ; calyx undulate ; leaves oblong-elliptic or obovate-elliptic, shortly cuneate at the base, acuminate, 6–12 cm. long, 2–7 cm. broad, glabrous, with 5–6 pairs of lateral nerves ; ovary glabrous ; fruit turgid (not lobed), 2–3 cm. diam., horned by the persistent calyces .. .. .. .. 1. *longiflora*

Peduncles solitary ; corolla-tube short and stout in bud, up to 3 cm. long, glabrous in the throat ; calyx-tube truncate, 4 mm. long ; leaves elliptic or oblong-elliptic, shortly cuneate at the base, shortly and obtusely acuminate, 6–15 cm. long, 3–8 cm. broad, glabrous, with about 6 pairs of lateral nerves ; ovary mostly puberulous ; fruit lobulate, 4 cm. diam. .. .. .. .. .. .. .. 2. *confusa*

Trees or shrubs, much-branched; peduncles leaf-opposed and often also terminal; flowers mostly 5-merous:

Branchlets slender, more or less terete; stipules large and foliaceous, soon falling off; peduncles usually 3 together, elongated and slender; flower-buds slender; leaves broadly elliptic to broadly ovate, more or less acuminate, rounded to broadly cuneate at the base, 8–16 cm. long, 4–8 cm. broad, often dark-purplish when dry, glabrous below, with 6–9 pairs of lateral nerves; fruiting-heads deeply lobulate 3. *lucida*

Branchlets stout, quadrangular; stipules small and persistent; peduncles stout; flower-buds stout; leaves broadly elliptic, triangular at the apex, up to 20 cm. long and 12 cm. broad, glabrous, dark when dry; fruit mostly subturgid, transversely ellipsoid or globose .. .. .. .. .. .. .. 4. *geminata*

1. **Morinda longiflora** *G. Don*—Hutch in Kew Bull. 1916 : 9; Holl. 3 : 374. A glabrous climbing shrub with heads of white sweet-scented tubular white flowers 2 in. or more long and yellow fruit composed of connate berries.

French Guinea: Kisosso (July)! Sierra Leone: several localities (fl. Jan.–May, fr. Nov.)! Gold Coast: Kwahu, 2,000 ft. (Apr.)! S. Nigeria: Idumuye (fr. Dec.)! Eket! Oban! Fernando Po (Mar., June)! Also in Cameroons. Exsicc.—*Don.* *Barter* 2061. *Mann* 411; 2341. *Sc. Elliot* 4901. *Johnson* 667. *Lane-Poole* 132. *Talb.* 3255. *Pobéguin* 793. (See Appendix).

2. **M. confusa** *Hutch.* l.c. 11, with fig.; Holl. 3 : 373. *M. longiflora* A. Chev. Bot. 338, not of G. Don. *Gaertnera morindoides* Baker. A glabrous climber like the last with flowers about 1 in. long with a stout tube.

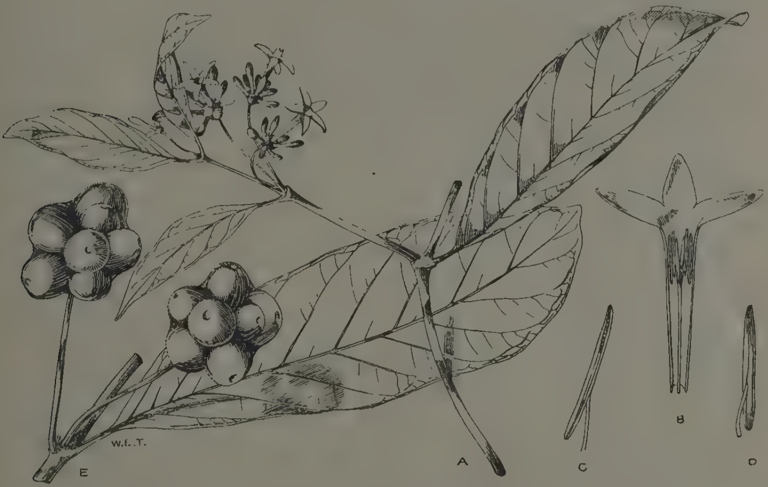

FIG. 212.—MORINDA LUCIDA *Benth.* (RUBIACEAE).

A, flowering shoot. B, corolla laid open. C and D, anthers. E, fruiting shoot.

French Guinea: Bilima! Dintia! Sierra Leone: several localities! Liberia: Monrovia! ? locality! Ivory Coast: Bingerville, etc.! Diambarakrou! Morénou! Gold Coast: Aburi (Aug.)! Assin Yan Kumasi! Axim! Dixcove (fr. Apr.)! Ankobra Junction (fr. Dec.)! Obuom (Dec.)! S. Nigeria: Epe! Ikoyi (Jan.)! Oban! Fernando Po (Nov.)! Extends to Angola and Upper Welle region. Exsicc.—*T. Vogel* 188. *Barter* 3272. *Mann* 810. *Moloney.* *Sc. Elliot* 4186; 4901. *Garrett* 28. *Rowland.* *Millen* 168. *Cummins* 43. *Johnson* 1069. *Whyte.* *Farmar* 347. *Lane-Poole* 193. *Talb.* 1335. *Chev.* 13800; 13808; 14451; 14690; 15479 bis; 15584; 17657; 18057; 22493; 22906. (See Appendix).

3. **M. lucida** *Benth.*—Hutch. l.c. 12, with fig.; Holl. 3 : 374. *M. citrifolia* A. Chev. Bot. 338, partly, not of Linn. A medium-sized tree with shining foliage and flowers about ½ in. long, the fruit-heads comparatively small, about ½–¾ in. in diameter.

Ivory Coast and Gold Coast: common! Togo: Lome! Sokode (Apr.)! Dahomey: Savalou, Gouka (May)! N. Nigeria: Abinsi (May–July)! S. Nigeria: various localities! Cameroons Mt., Tiko (Jan.)! Cameroons R. (Jan.)! Fernando Po! Extends to Angola, Upper Belgian Congo and Uganda. Exsicc.—*T. Vogel* 77. *Barter* 1234; 1753; 2039; 3388. *Mann* 77. *Irving* 70. *Millson.* *Moloney.* *Millen* 106. *Chipp* 21; 180. *King-Church* 871. *Dalz.* 641. *Talb.* 3148; 3233; 3709. *Dunlap* 249. *Chev.* 12699; 17101; 17639; 19995; 20149; 22856; 23222; 23721. *Krause.* *Kersting* 64. *Warnecke* 177. (See Appendix).

4. **M. geminata** *DC.*—Hutch. l.c. 14, with fig. *M. citrifolia* A. Chev. Bot. 338, partly, not of Linn. *M. citrifolia* var. *macrophylla* Hua. A small tree up to 20–30 ft. high with 4-angled branchlets, glossy foliage and white flowers fairly stout about 1 in. long; the fruit is whitish, rather fleshy, irregularly shaped 1½–2½ in. in diameter.

French Sudan: Sareya (Feb.)! Senegal: near Cape Verde, Rufisque, etc.! Sedhiou! Séléki! Gambia! French Guinea: Kaba Valley (May)! Kindia (Mar.)! Isles de Los (Feb.)! Kouroussa (Apr.)! Sierra Leone: Freetown and environs (often planted)! Njala (Feb.)! Mano! Bo (Jan.)! Batkanu (fr. Apr.)! Gbanbama! Victoria! Bagroo R.! Pujehun (Feb.)! Liberia: Reppo's Town (Aug.)! Ivory Coast: Tépo country! S. Nigeria: Victoria (introduced)! Exsicc.—*Döllinger* 52. *Heudelot.* *T. Vogel* 143; 145. *Barter* (no number). *Kirk* 28. *Mann* 717. *Sc. Elliot* 5278. *Lane-Poole* 152. *Chev.* 464; 2101 bis; 2121; 13063; 13067; 13186; 19715. *Bequaert.* *Pobéguin* 693. (See Appendix).

### 52. **LASIANTHUS** Jack—F.T.A. 3 : 228.

Shrub ; branchlets pilose ; leaves obovate-elliptic, acutely acuminate, cuneate at the base, 15–20 cm. long and about 7 cm. broad, pilose on the midrib below, with 12–14 pairs of spreading arched and looped lateral nerves, laxly reticulate between the nerves ; stipules broadly ovate-triangular, nearly 1 cm. long, pilose outside ; flowers 3 4 in the leaf axils ; drupes depressed-globose, 10–12-seeded, black, about 8 mm. diam. .. .. .. .. .. .. .. .. .. .. *batangensis*

**L. batangensis** *K. Schum.* in Engl. Bot. Jahrb. 38 : 107. *L. Mannii* Wernham.
Sierra Leone : Jepilum ! Liberia : Grand Bassa (Sept.) ! Yeh River (Oct.) ! Bumbuna ! Ivory Coast : various localities ! S. Nigeria : Oban ! Extends to Portuguese Congo. Exsicc.—*Talb.* 266. *Dinklage* 1750. *Chev.* 15280, etc. *Smythe* 229. *Linder* 991 ; 1331.

### 53. **PSYCHOTRIA** Linn.—F.T.A. 3 : 193.

Stipules very large and imbricate, about 4 cm. long, divided into numerous subulate-filiform lobes, puberulous outside ; leaves elongate-obovate-oblanceolate, about 35 cm. long and 10 cm. broad, finely silky-pubescent below .. 1. *fimbriata*
Stipules and leaves not as above :
*Bracts large and conspicuous, persistent :
Inflorescence a more or less pyramidal branched pedunculate cyme or rarely a fairly long-pedunculate cluster :
Branchlets glabrous or with only a narrow line of hairs :
Lateral nerves of the leaves about 9–10 pairs ; petiole usually less than 0·5 cm. long :
Leaves oblanceolate, gradually and rather broadly acuminate, long-attenuated to the base, 10–12 cm. long, 2–6 cm. broad, glabrous ; stipules 1 cm. long, deeply bilobed ; bracts puberulous, about 1 cm. long ; corolla 8 mm. long 2. *sodifera*
Leaves oblong-elliptic, shortly acute at the base, acutely acuminate at the apex, 7–10 cm. long, 2·5–4 cm. broad, slightly pubescent on the midrib below ; stipules 1 cm. long, bilobed ; bracts as above ; corolla 8 mm. long.. .. 3. *obscura*
Lateral nerves about 15–20 pairs ; petiole 1 cm. long or more :
Midrib covered with rather long slender hairs below ; leaves obovate, acuminate, 10–15 cm. long, 4–7 cm. broad, pubescent on the 14–16 pairs of lateral nerves below ; petiole 1 cm. long, pilose ; cymes on slender peduncles, lax, few-flowered ; bracts ciliate ; fruits ribbed, on rather long stout pedicels .. .. 4. *pilifera*
Midrib glabrous below or very shortly puberulous :
Lobes of the stipules with long slender points ; leaves oblong-elliptic, broadly and gradually acuminate, sharply cuneate at the base, 12–15 cm. long, with about 15 pairs of lateral nerves ; cymes small on slender peduncles ; corolla 4 mm. long, shortly 5-toothed.. .. .. .. .. .. 5. *Farmari*
Lobes of the stipules at most shortly and abruptly acuminate :
Cymes shortly pedunculate and laxly branched, the axis and branches hirsute ; leaves obovate-elliptic, broadly acuminate, abruptly cuneate at the base, 15–18 cm. long, 6–10 cm. broad, with about 20 pairs of lateral nerves ; fruits ribbed, 5 mm. long, shortly stalked .. .. .. 6. *latistipula*
Cymes long-pedunculate, with few branches and crowded flowers, axis glabrous or nearly so ; leaves obovate, acutely subtriangular-acuminate, 15–20 cm. long, 4–8 cm. broad, glabrous, often reddish below ; corolla 8–10 mm. long ; fruit ribbed, 7 mm. long .. .. .. .. .. .. 7. *bidentata*
Branchlets more or less tomentose or pubescent all over :
Shrubs, more or less branched, not from a rhizome :
Branchlets midrib and inflorescence with very short hairs ; leaves not bullate, obovate or obovate-elliptic, broadly acuminate, cuneate at the base, 10–20 cm. long, 5–10 cm. broad, often reddish when dry, with numerous pairs of conspicuous lateral nerves looped close to the margin ; petiole up to 3 cm. long ; inflorescence pedunculate ; bracts ciliate ; fruits ribbed, 7–8 mm. long .. 8. *Vogeliana*
Branchlets midrib and inflorescence with long and spreading hairs ; leaves more or less bullate, otherwise much as in the preceding .. .. .. 9. *rufipilis*
Shrublets a few inches to 1 ft. or rarely 3 ft. high with short stems from a woody rhizome :
Leaves gradually acutely acuminate, oblong-elliptic, about 10 cm. long and 3–4 cm. broad, reddish-brown when dry, rather thin ; inflorescence very small and with rather small bracts ; fruits 5 mm. long, ribbed .. .. .. 10. *reptans*
Leaves rounded to subacute at the apex, oblong-elliptic, 5–7 cm. long, 2–3 cm. broad, paler and pubescent on the midrib and 7–8 pairs of lateral nerves below ; stipules shortly bifid ; peduncle 3 cm. long, tomentose ; corolla rather slender ; stamens exserted .. .. .. .. .. .. 11. *Kitsonii*
Inflorescence a more or less globose or compact sessile or subsessile cluster :
Stems short and simple from a rhizome, pubescent ; leaves oblong, rounded at the apex and base, 4–5 cm. long, 1·5–3 cm. broad, pubescent on the lower surface ; petiole 5 mm. long ; flowers very few, subsessile at the top of the shoot ; corolla nearly 1 cm. long ; anthers shortly exserted .. .. .. 12. *neurodictyon*

Stems branched, not from a rhizome; leaves elliptic or obovate, broadly acuminate, 10–12 cm. long, 5–6 cm. broad, obtuse at the base; petiole about 5 mm. long, shortly rusty-pubescent; lateral nerves about 15 pairs; stipules pubescent, connate; inflorescence small, globose, sessile .. .. .. .. 13. *globosa*

**Bracts very small and often soon deciduous:

† Corolla 5-lobed:

‡ Flowers in more or less openly (not head-like) branched cymes:

Leaves narrowly linear-lanceolate:

Inflorescence pedunculate:

Peduncle very slender, about 6 cm. long, sharply ribbed; leaves gradually tapered to both ends, about 10 cm. long and 2 cm. broad, with few lateral nerves; petiole about 1·5 cm. long; corolla 7–8 mm. long .. .. .. 14. *Talbotii*

Peduncle rather stout, about 3 cm. long; leaves shortly lanceolate, about 8 cm. long and 2 cm. broad, glabrous; petiole about 5 mm. long; corolla 6 mm. long; anthers long-exserted .. .. .. .. .. .. .. 15. *Huae*

Corolla 3 mm. long; anthers tips only exserted .. .. 16. *adafoana*

Inflorescence sessile, branched from the base; leaves lanceolate, not acuminate, 6–12 cm. long, 1·3–2·3 cm. broad, with about 8 pairs of lateral nerves; petiole 1 cm. long; corolla 7 mm. long; anthers long-exserted .. 17. *Williamsii*

Leaves broadly lanceolate to obovate:

Leaves large, 16–30 cm. long, with 12–15 pairs of lateral nerves:

Veins very conspicuous between the 10–12 pairs of lateral nerves:

Leaves elliptic, very shortly acuminate, about 25 cm. long and 12 cm. broad, with a very stout midrib ribbed below; petiole 4 cm. long; inflorescence nearly sessile; corolla 7 mm. long, densely hairy within the throat 18. *arborea*

Leaves obovate-elliptic, broadly acuminate, about 30 cm. long and 14 cm. broad, with a stout smooth midrib below; petiole 5 cm. long; inflorescence subsessile, few-flowered; corolla over 1 cm. long, thick, densely hairy within the throat .. .. .. .. .. .. .. 19. *crassicalyx*

Veins invisible or nearly so:

Cymes with many spreading branches and numerous flowers; peduncle about 2 cm. long; leaves ovate-elliptic, obtuse at the apex, about 30 cm. long and 12 cm. broad, with 12–14 pairs of lateral nerves; petiole 3–4 cm. long; fruits 8 mm. long .. .. .. .. .. .. .. .. 20. *Limba*

Cymes with few branches and few flowers; peduncle about 1 cm. long; leaves broadly oblong-elliptic, very shortly pointed, very abruptly cuneate at the base, 16–25 cm. long, 6–10 cm. broad, with 12–14 pairs of lateral nerves; petiole 1·5–2 cm. long.. .. .. .. .. .. 21. *Rowlandii*

Leaves much smaller, up to about 12 cm. long, with usually much fewer pairs of lateral nerves:

Flowers distinctly pedicellate:

Leaves small, at most 8 cm. long:

Leaves obovate-oblanceolate, rather obtusely acuminate, 5–8 cm. long, 1·5–3 cm. broad, with about 8 pairs of lateral nerves; petiole 5 m. long, strigose above; flowers very few and small; anthers included .. .. 22. *bifaria*

Leaves obovate-elliptic, broadly acuminate, 6–8 cm. long, 2·5–4 cm. broad, with about 8 pairs of lateral nerves, glabrous on both surfaces; petiole pubescent; flowers few and small; anthers exserted .. 23. *minimicalyx*

Leaves larger, 10 cm. long or more:

Calyx truncate or undulately lobed:

Inflorescence rather large and many-flowered, 5 cm. or more in diam., the branches sub-umbelliform; leaves greenish when dry, oblong-elliptic to obovate, obtuse to broadly acuminate, up to 20 cm. long, 3·5–8 cm. broad; flowers small; fruits about 6 mm. long .. .. .. .. 24. *calva*

Inflorescence very small and rather few-flowered, 2–2·5 cm. diam.:

Leaves narrowly obovate to elongate-oblanceolate, acutely acuminate, 10–20 cm. long, 3–7 cm. broad, with 12–14 pairs of lateral nerves; petiole 2 cm. long; flowers small and narrow .. .. .. 25. *potanthera*

Leaves oblong, shortly cuneate and unequal-sided at the base, 16 cm. long, 4–6 cm. broad, abruptly acuminate, with about 10 pairs of lateral nerves spreading at a right angle; petiole 6–7 cm. long .. 26. *viticoides*

Calyx distinctly lobed; leaves oblong-oblanceolate, acuminate, 10–15 cm. long, 3·5–4·5 cm. broad, glabrous, with 7–8 pairs of lateral nerves, blackish when dry; petiole 0·5–1 cm. long; stipules shaggy inside; inflorescence small, branched from the base .. .. .. .. 27. *sciadephora*

Flowers sessile or subsessile:

Petiole very short; branchlets puberulous; leaves broadly lanceolate, acute, 7–10 cm. long, 2–3 cm. broad, with 6–7 pairs of lateral nerves; stipular sheath densely puberulous; cymes few-flowered, shortly pedunculate; calyx with triangular teeth .. .. .. .. .. .. 28. *albicaulis*

Petiole 0·5 cm. long or more :

Inflorescence long-pedunculate, with or without a pair of small leaves at the first branches ; leaves broadly elliptic, obtusely pointed at the apex, subdecurrent on the petiole at the base, 12–16 cm. long, 6–10 cm. broad, glabrous ; lateral nerves about 10 pairs ; corolla 7 mm. long .. .. 29. *Dalzielii*

Inflorescence shortly pedunculate :

Lateral nerves about 14–15 pairs ; stipules shortly bilobed, very hairy, 1·5 cm. long ; leaves obovate-elliptic, about 15 cm. long and 5–6 cm. broad ; corolla very hairy in the throat .. .. .. .. .. 30. *sphaerocarpa*

Lateral nerves 6–8 pairs ; stipules small and soon deciduous :

Corolla about 3–4 mm. long :

Petiole about 1 cm. long ; leaves gradually pointed at the base, acutely acuminate, about 8 cm. long and 3 cm. broad, thin ; inflorescence pubescent .. .. .. .. .. .. .. 31. *Benthamiana*

Petiole 3–4 cm. long ; leaves abruptly cuneate at the base, elliptic, broadly acuminate, about 10 cm. long and 6 cm. broad ; flowers rather few 32. *Warneckei*

Corolla 7 mm. long, lobes keeled ; cymes pyramidal ; leaves broadly obovate-elliptic, about 15 cm. long and 6 cm. broad, thin .. 33. *pteropetala*

‡‡ Flowers in congested head-like clusters, often subsessile :

Leaves narrowly lanceolate, gradually pointed at both ends, 8–11 cm. long, 2–2·5 cm. broad, glabrous, thin and green when dry ; pedicels distinct ; flowers very small, 4 mm. long ; peduncle slender, 1 cm. long ; fruits subglobose, 8 mm. long 34. *recurva*

Leaves more or less elliptic or obovate-oblong :

Leaves large, 15–20 cm. long, broadly elliptic, with 8 or more pairs of lateral nerves :

Corolla about twice as long as the calyx ; leaves about 20 cm. long, broadly oblong-oblanceolate, gradually acute ; stipules ovate, deeply bilobed, 1·5 cm. long, tomentose outside ; peduncle 1·5 cm. long ; head 1·5 cm. diam. 35. *Dorotheae*

Corolla about twice as long as the calyx ; leaves 15 cm. long, 8–9 cm. broad, shortly and abruptly acuminate ; petiole 3 cm. long ; heads very small 36. *piolampra*

Corolla about 3–4 times as long as the calyx ; leaves elliptic, 17–20 cm. long, 8–10 cm. broad, with about 12 pairs of lateral nerves ; petiole 3·5 cm. long ; calyx green, toothed .. .. .. .. .. .. 37. *obanensis*

Corolla about twice as long as calyx ; leaves 25 cm. long, elongate-oblong-oblanceolate, abruptly acuminate, thin ; petiole 8 cm. long .. 38. *capitellata*

Leaves smaller, obovate or oblong :

Corolla up to about twice as long as the calyx :

Heads sessile or subsessile :

Pedicels glabrous ; leaves broadly oblong-oblanceolate, broadly acuminate, 8–14 cm. long, 2·5–4 cm. broad, with about 6 pairs of lateral nerves ; flower-clusters very small .. .. .. .. .. .. 39. *subobliqua*

Pedicels puberulous, stout ; leaves obovate-elliptic, broadly acuminate, about 15 cm. long, 5–7 cm. broad, with about 8 pairs of lateral nerves ; flowers very crowded .. .. .. .. .. .. .. 40. *albifaux*

Heads long-pedunculate, peduncle 5 cm. long, densely pubescent ; leaves obovate-elliptic, about 15 cm. long and 7 cm. broad, slightly pubescent below ; petiole 2–3 cm. long .. .. .. .. .. .. .. .. 41. *mollipes*

Corolla about 3–4 times as long as the calyx :

Pedicels distinct, about 3 mm. long ; leaves obovate to oblong-elliptic, acutely-acuminate, 9–15 cm. long, 3–5 cm. broad, thin ; flowers very few ; pedicels puberulous .. .. .. .. .. .. .. .. 42. *insidens*

Pedicels absent or very short :

Leaves gradually acuminate, long-attenuated at the base, about 14 cm. long and 5 cm. broad, thin ; petiole 1·5 cm. long ; lateral nerves 9–10 pairs 43. *subherbacea*

Leaves gradually acuminate, rather shortly cuneate at the base, 15–18 cm. long, 4–6·5 cm. broad, glabrous ; petiole 2–4 cm. long ; lateral nerves about 10 pairs ; stamens long-exserted .. .. .. .. 25. *polanthera*

Leaves abruptly acuminate, shortly cuneate at the base, about 15 cm. long, 5–6 cm. broad, thin ; petiole 1–2 cm. long ; lateral nerves about 8 pairs 44. *subnuda*

† Corolla 4-lobed :

Branchlets straw-coloured, with 2 distinct wings ; leaves subsessile, broadly oblong-oblanceolate, gradually acuminate, 5–9 cm. long, 2–3 cm. broad, thin and greenish when dry .. .. .. .. .. .. .. .. 45. *lophoclada*

Branchlets at most angular :

Lateral nerves about 5–6 pairs :

Leaves broadly obovate, broadly triangular at the apex, broadly cuneate at the base, 6–8 cm. long, 3–4 cm. broad, glabrous; corolla-lobes long and horn-like 46. *cornuta*
Leaves broadly oblong-oblanceolate, broadly-acuminate, acutely cuneate at the base, 7–10 cm. long, 2–3·5 cm. broad, puberulous on the midrib below; inflorescence about ½ as long as the leaves; corolla-lobes not horn-like 47. *nigrescens*
Lateral nerves 8–12 pairs:
Peduncle of inflorescence neither flattened nor winged:
Peduncle as long as the flowering part of the inflorescence, very slender; flowers very small; leaves obovate, about 16 cm. long and 9 cm. broad; petiole 1–2 cm. long:
Anthers exserted .. .. .. .. .. .. 48. *brachyantha*
Anthers included:
Midrib glabrous .. .. .. .. .. .. .. 49. *aledjoensis*
Midrib pubescent .. .. .. .. .. 50. *brachyanthoides*
Peduncle much shorter than the flowering part of the inflorescence; flowers rather numerous in a divaricate cyme; leaves oblong-elliptic, acuminate, shortly cuneate at the base, about 15 cm. long and 6 cm. broad, thin .. 51. *setacea*

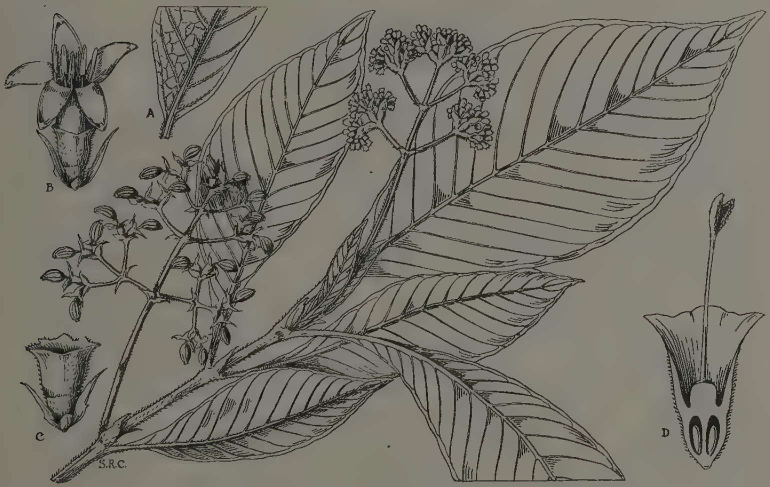

Fig. 213.—Psychotria Vogeliana *Benth.* (Rubiaceae).
A, lower surface of leaf. B, flower. C, calyx and bracts. D, longitudinal section of ovary.

Peduncle of inflorescence flattened and winged; inflorescence laxly paniculate, about 12 cm. long; pedicels about 4 mm. long; leaves oblong-elliptic, bluntly acuminate, shortly cuneate and unequal-sided at the base, about 15 cm. long and 6 cm. broad, glabrous; petiole 2 cm. long. .. .. .. 52. *ceratalabastron*

1. **Psychotria fimbriata** *A. Chev.* Bot. 341, name only. A low shrub of forest undergrowth, 2–5 ft. high, with long leaves and greenish-white flowers.
Ivory Coast: Cavally Basin, Tépo country, between Toula and Nékaougnié (July)! Grabo, Mt. Tou, amongst rocks (July)! Exsicc.—*Chev.* 19582; 19683.
2. **P. sodifera** *De Wild.* Pl. Bequaert. 2: 421. *Grumilea sodifera* A. Chev. A shrub 4 ft. high, more or less glabrous except the inflorescence and a line of hairs on the branchlets, with small white flowers in axillary or subterminal branched cymes.
Ivory Coast: Baoulé-Sud, Toumodi (Aug.)! Gold Coast: hills behind Odumase (Dec.)! N. Nigeria: ? locality (May)! Also in Shari-Chad. Exsicc.—*Johnson* 513. *Shaw* 54. *Chev.* 22414.
3. **P. obscura** *Benth.*—F.T.A. 3: 212. A nearly glabrous climbing shrub with inflorescence like the last.
Gold Coast: Accra! Exsicc.—*T. Vogel* (no number).
4. **P. pilifera** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Cephaelis Talbotii* Wernham. A more or less scrambling shrub pubescent on the young parts, with small flowers in a lax branched cyme.
S. Nigeria: Oban! Eket! Exsicc.—*Talb.* 234; 3386.
5. **P. Farmari** *Hutch. & J. M. Dalz.* l.c. ined. A shrub, mostly glabrous except the inflorescence.
Gold Coast: ? locality! Exsicc.—*Farmar* 385.
6. **P. latistipula** *Benth.*—F.T.A. 3: 210; Chev. Bot. 342. *P. subglabra* De Wild. A lax shrub of forest undergrowth with fairly large many-nerved leaves and small white flowers in little head-like clusters forming a lax-branched bracteate cyme.
Ivory Coast: between Middle Sassandra and Middle Cavally (June–July)! S. Nigeria: Oban! Victoria (Apr., May)! Fernando Po (Apr., June, fr. Dec.)! Exsicc.—*T. Vogel* (no number). *Barter* (no number). *Mann* 40; 1425. *Talb.* (no number). *Maitland* 721. *Schlechter* 12374. *Chev.* 19216.

7. **P. bidentata** *Hiern*—F.T.A. 3 : 209 ; Stapf 613 ; Chev. Bot. 340. *P. Garrettii* K. Schum. A nearly glabrous shrub with many-nerved leaves and small flowers numerous in close head-like clusters in cymes.

French Guinea : Iles de Los (Feb.) ! Futa-Jallon, Dalaba (Mar.) ! Sierra Leone : several localities ! Liberia : Grand Bassa (July) ! Monrovia ! Exsicc.—*T. Vogel* 40. *Whyte*. *Garret*. *N. W. Thomas* 6174 ; 7270 ; 7386. *Macdonald* 1. *Chev.* 18189. (See Appendix).

8. **P. Vogeliana** *Benth.*—F.T.A. 3 : 210 ; Stapf 613 ; Chev. Bot. 342, partly. *P. multinervis* De Wild. *P. reptans* A. Chev. Bot. 342, not of Benth. *P. Buettneri* K. Schum. *P. sarcopoda* Mildbr. A small tree or shrub, sometimes half-scrambling in forest undergrowth, more or less rusty-pubescent, with white flowers ¼ in. long in numerous small head-like clusters of a branched cyme.

Common in forest and in ravines from Senegal and French Sudan to N. and S. Nigeria ! Extends to Congo. Exsicc.—*T. Vogel* 73. *Barter* 1253. *Baikie*. *Mann* 502. *Johnston* 44. *Rowland*. *Johnson* 565. *Chipp* 765. *Foster* 93. *Dalz.* 25 ; 530 ; 642. *Lely* 228. *Schlechter* 13034. *Chev.* 12644 ; 12673 ; 19520 ; 23193 ; 23591.

9. **P. rufipilis** *A. Chev.* Bot. 342, name only ; De Wild. Pl. Bequaert, 2 : 415 (descr.) A shrub or small tree very much like the last, with small white or pink flowers.

French Guinea : Dalaba Plateau, 3,000–4,000 ft. ! Sierra Leone : various localities ! Liberia : Kakatown ! Dukwia R. (May) ! Du River ! Banga (Oct.) ! Ivory Coast : Grabo (Aug.) ! Upper Nuon, foot of Mt. Nouba ! Summit of Mt. Gbon, 3,500 ft. ! Exsicc.—*N. W. Thomas* 6982, etc. *Sc. Elliot* 5824. *Deighton* 1758 ; 2124. *Whyte*. *G. P. Cooper* 447. *Linder* 102 ; 1214. *Chev.* 20297 ; 20332 ; 21124 ; 21409. (See Appendix).

10. **P. reptans** *Benth.*—F.T.A. 3 : 211. A small shrub of forest undergrowth, prostrate or half-climbing, rusty-pubescent, with small white or pink flowers and ribbed whitish berries.

Sierra Leone : common ! Gold Coast : Cape Coast. Exsicc.—*T. Vogel* 76. *Mann* (no number). *Sc. Elliot* 3864. *Deighton* 664 ; 1128. *N. W. Thomas* 827 ; 1871 ; 3445 ; 3700 ; 3708 ; 5636. (See Appendix).

11. **P. Kitsonii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A small undershrub from a woody base, with small white flowers rather crowded in a short pedunculate cyme.

Gold Coast : Afram Plains, between Agbolo and Dedesa (May) ! Exsicc.—*Kitson* 1129.

12. **P. neurodictyon** *K. Schum.* in Engl. Bot. Jahrb. 33 : 368. *Geophila aurantiaca* A. Chev. Herbaceous, erect or decumbent, softly pubescent, the leaves with 4–6 nerves and prominent network of veins below.

Ivory Coast : Malamalasso (Mar.) ! Lower Cavally, Tébo (July) ! S. Nigeria : Barombi ! Cameroons Mt., Victoria and neighbourhood (Mar.–May) ! Also in French Cameroons and Prince's Island. Exsicc.—*Preuss* 1196 ; 3127. *Schlechter* 12364. *Chev.* 17538 ; 19380.

13. **P. globosa** *Hiern*—F.T.A. 3 : 208. *P. ionantha* K. Schum. *P. bimbiana* K. Schum. A low shrub with white flowers ⅓ in. long or more, sessile, crowded in a terminal bracteate head.

Cameroons Mt., Ambas Bay and vicinity (Feb.) ! Bibundi ! Exsicc.—*Mann* 1330. *Preuss* 1209 ; 1376. *Schlechter* 12403.

14. **P. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 54. *P. potamogetonoides* Wernham. A glabrous shrub with striate branchlets, narrow leaves and white flowers ¼–⅓ in. long in loose branched long-pedunculate cymes.

S. Nigeria : Oban ! Degema ! Rio del Rey ! Exsicc.—*Talb.* 1054 ; 3817. *Johnston*.

15. **P. Huae** *De Wild.* Pl. Bequaert. 2 : 372. *P. Kolly* A. Chev. Bot. 341, partly not of Schum. A glabrous shrub with yellow flowers ⅓ in. long in a fairly stout terminal cyme.

N. Nigeria : Bauchi Plateau, Vom, 3,000–4,500 ft. ! Exsicc.—*Dent Young* 123.

16. **P. adafoana** *K. Schum.* in Engl. Bot. Jahrb. 28 : 90. *P. ivorensis* De Wild. *P. recurva* Chev. Bot. 342, not of Hiern. A low branched shrub, nearly glabrous, with small white flowers in small shortly pedunculate cymes.

Ivory Coast : Lower Comoé, at Abradines (Mar.) ! Assinie (Apr.) ! Gold Coast : Adafo ! Exsicc.—*Krause* 55. *Chev.* 17569 ; 17879.

17. **P. Williamsii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A glabrous shrub of the savannah forests with white flowers ¼–⅓ in. long in branching cymes.

Gold Coast : Ejura (Apr.) ! Afram Plains, Ampoti to Adumasia (May) ! Nabiungo (May) ! Exsicc.—*Lloyd Williams* 228. *Kitson* 736 ; 1096. *Johnson* 143.

18. **P. arborea** *Hiern*—F.T.A. 3 : 202. A small tree, nearly glabrous, with large leaves and small white flowers numerous in a short branching terminal cyme.

S. Nigeria : Calabar ! Exsicc.—*Thomson* 106.

19. **P. crassicalyx** *K. Krause* in Engl. Bot. Jahrb. 57 : 46. Erect shrub with stout branchlets shortly pilose when young, and white (turning black) waxy flowers ⅓–½ in. long in very short panicles.

Fernando Po : in forest on north side of the Peak, above Basilé, 1,800–2,450 ft. (Nov.) ! Exsicc.—*Mildbr.* 7124.

20. **P. Limba** *Scott Elliot* in Journ. Linn. Soc. 30 : 83. A glabrous shrub with rather large pale green leaves, and copious small white flowers in stiff branching cymes.

Sierra Leone : between Kahreni and Port Lokko (Apr.) ! Lumbaraya (Feb.) ! Talla, Lomaburn (Feb.) ! Mabonto (fr. Oct.) ! Exsicc.—*Sc. Elliot* 4947 ; 5023 ; 5815.

21. **P. Rowlandii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A nearly glabrous shrub with fairly large leaves and white flowers ¼ in. long in stoutish terminal cymes.

S. Nigeria : Lagos Colony ! Exsicc.—*Rowland*.

22. **P. bifaria** *Hiern*—F.T.A. 3 : 198. A slender branched shrub 2–3 ft. high in forest undergrowth, the young branchlets hairy along two lines, with small narrow white flowers on slender pedicels forming delicate cymes.

S. Nigeria : Rio del Rey ! Fernando Po (June) ! Also in Cameroons. Exsicc.—*Mann* 419. *Johnston*.

23. **P. minimicalyx** *K. Schum.* in Engl. Bot. Jahrb. 28 : 94. A small shrub 1–2 ft. high, dichotomously branching, brown-red-pubescent on the young parts, with small white flowers in small subsessile panicles.

S. Nigeria : Johann Albrechtshöhe, in forest undergrowth (Feb.) ! Exsicc.—*Staudt* 206.

24. **P. calva** *Hiern*—F.T.A. 3 : 199 ; Stapf 613 ; Chev. Bot. 340. *P. floribunda* De Wild. *P. micrantha* var. *floribunda* A. Chev. Bot. 343. *Grumilea micrantha* Hiern—F.T.A. 3 : 217 ; Stapf 614. A glabrous shrub with pale green leaves, drooping branched cymes of small white flowers, and white berries turning red when ripe.

French Guinea : Futa-Jallon ! Sierra Leone : Sasseni, Scarcies R. (fr. Jan.) ! Kanya (fr. Oct.) ! Bumbuna ! Kundala Hill (fr. Mar.) ! Liberia : Monrovia ! Sino Basin ! Totokwelli (Oct.) ! Ivory Coast : Tabou to Bériby, by the sea (Aug.) ! Gold Coast : Afram Plains ! S. Nigeria : Kradu Lake ! Lagos, Ikoyi (Apr.) ! Lagos Colony ! Agolo ! Obu ! Fernando Po (fr. Nov.) ! Also in Cameroons and ? Gabon. Exsicc.—*T. Vogel* 190. *Barter* 2204 ; 3245. *Sc. Elliot* 4527. *Rowland*. *Whyte*. *Kitson* 1123. *Linder* 1297. *Chev.* 12833 ; 19951.

25. **P. potanthera** *Wernham* in Cat. Talb. Nig. Pl. 54. A glabrous shrub with pithy branchlets and small narrow white flowers in short lax cymes.

S. Nigeria : Oban ! Exsicc.—*Talb.* 240.

26. **P. viticoides** *Wernham* l.c. A glabrous shrub with rather larger flowers than the last.

S. Nigeria : Oban ! Exsicc.—*Talb.* 2080.

27. **P. sciadephora** *Hiern*—F.T.A. 3 : 202. *P. brevistipulata* De Wild. A nearly glabrous shrub up to 10 ft. high with small brownish white flowers in short rather dense terminal cymes, the leaves and inflorescence turning blackish in drying.

French Guinea : Guerzé country, Nzo to Sokonante, foot of Mt. Nzo (Mar.) ! S. Nigeria : Oban ! Ambas Bay (Jan.) ! Cameroons Mt., 4,000 ft. (Feb.) ! Also in French Cameroons. Exsicc.—*Mann* 729 ; 1192. *Talb.* 2045. *Chev.* 21081.

28. **P. albicaulis** *Scott Elliot* in Journ. Linn. Soc. 30 : 83. A low shrub, slightly hairy on the young branchlets, with small white flowers in short terminal cymes.

Sierra Leone : between Erimakuna and Farana (Mar.) ! Falaba, near Musaia (Mar.) ! Exsicc.—*Sc. Elliot* 5124 ; 5312.

29. **P. Dalzielii** *Hutch.* in Kew Bull. 1931 : ined. A shrub a few feet high with fairly broad shining leaves pale and net-veined beneath, and small yellow flowers ¼ in. long numerous in spreading cymes on long rather stout peduncles.

N. Nigeria : Abinsi, in wooded hilly bush (Aug.) ! Exsicc.—*Dalz.* 643.

30. **P. sphaerocarpa** *Hutch. & J. M. Dalz* .in Kew Bull. 1931 : ined. *Grumilea sphaerocarpa* Hiern –F.T.A. 3 : 218. A shrub 8–10 ft. high, with glabrescent branchlets and small white flowers crowded in a terminal pedunculate cyme.

Fernando Po (Jan.) ! Exsicc.—*Mann* 223.

31. **P. Benthamiana** *Hiern*—F.T.A. 3 : 204. A glabrous shining shrub erect or straggling with small white or purplish flowers crowded in short branched cymes, the inflorescence and branchlets often reddish-purple.

French Guinea : Macenta and neighbourhood, common (Apr., May) ! Sierra Leone : various localities ! Gold Coast : Kwahu Tafo (fr. Apr.) ! Nchenenchene (fr. Apr.) ! Fernando Po ! Exsicc.—*T. Vogel* (no number). *Sc. Elliot* 4713 ; 4905 ; 4951 ; 5870. *Collenette* 6 ; 18.

32. **P. Warneckei** *K. Schum. & K. Krause* in Engl. Bot. Jahrb. 39 : 558 ; Chev. Bot. 343. *P. Kolly* Schum. ? *P. infundibularis* A. Chev. Bot. 341, not of Hiern. *Chasalia yorubensis* K. Schum., name only. A glabrous shrub with white or reddish-green flowers ¼–⅓ in. long in short branched terminal cymes.

Fairly common from French Guinea to S. Nigeria ! N. Nigeria : Katsina Allah (Dec.) ! Exsicc.—*Sc. Elliot* 4211. *Rowland.* *Dalz.* 648 ; 1044 ; 1205 ; 8268. *Deighton* 694. *Dodd* 404. *Chev.* 17406 ; 20937. *Warnecke* 381. *Brass.*

33. **P. pteropetala** *K. Schum.* in Engl. Bot. Jahrb. 33 : 369. A glabrous shrub with narrow white flowers ¼ in. long in a terminal branched lax cyme.

S. Nigeria : Victoria (Apr.) ! Fernando Po ! Exsicc.—*Preuss* 1201. *Mann* 310.

34. **P. recurva** *Hiern*—F.T.A. 3 : 206. *P. bicarinata* Mildbr. A small glabrous shrub 4–5 ft. high with narrow leaves and very small white flowers few in a terminal pedunculate cluster.

Fernando Po ! Exsicc.—*Mann* 1430. *Mildbr.* 6825.

35. **P. Dorotheae** *Wernham* in Cat. Talb. Nig. Pl. 53.

S. Nigeria : Oban ! Exsicc.—*Talb.* 1561.

36. **P. piolampra** *K. Schum.* in Engl. Bot. Jahrb. 28 : 97. A glabrous shrub with rather large leaves and very small flowers crowded in a short cymose cluster, the inflorescence deep wine-red at least when dry.

S. Nigeria : Johann-Albrechtshöhe ! On moist slopes near the lake (Mar.) ! Exsicc.—*Staudt* 738.

37. **P. obanensis** *Wernham* in Cat. Talb. Nig. Pl. 53. A glabrous shrub with rather large leaves and narrow white flowers ¼ in. long in a compact subsessile cluster.

S. Nigeria : Oban ! Exsicc.—*Talb.* 244.

38. **P. capitellata** *A. Chev.* Bot. 340, name only ; De Wild. Pl. Bequaert. 2 : 348 (descr.).

Ivory Coast : various loc. ! Exsicc.—*Chev.* 19618 ; 19779.

39. **P. subobliqua** *Hiern*—F.T.A. 3 : 206. *P. caduciflora* De Wild. *P. copeensis* De Wild. *P. yabaensis* De Wild. *P. anetoclada* and var. *augustifolia* A. Chev. Bot. 339, partly, not of Hiern. *P. refractiloba* K. Schum. A nearly glabrous shrub a few feet high, with small flowers in small terminal umbellate heads.

Ivory Coast : Anyama, Potou Lagoon (Feb.) ! Cavally Basin, Grabo, Mt. Copé (July) ! S. Nigeria : Ikorodu (Mar.) ! Johann-Albrechtshöhe ! Fernando Po ! Exsicc.—*Mann* 1421. *Schlechter* 12305. *Staudt* 932. *Chev.* 19412 ; 19677 ; 20098.

40. **P. albifaux** *K. Schum.*, MS. A nearly glabrous shrub with small flowers rather numerous crowded in a dense subsessile cluster.

S. Nigeria : Ubulubu (Feb.) ! Also in Cameroons. Exsicc.—*N. W. Thomas* 2315.

41. **P. mollipes** *K. Krause* in Engl. Bot. Jahrb. 57 : 45. A small erect shrub with nearly glabrous branchlets, and small white (drying red-brown) flowers subsessile in small globose heads.

Fernando Po : in forest on north side of the Peak, above Basilé, 1,800–2,400 ft. (Aug.) ! Exsicc.—*Mildbr.* 6360.

42. **P. insidens** *Hiern*—F.T.A. 3 : 208. A straggling undershrub, nearly glabrous, with narrow white flowers ¼ in. long few in umbelliform clusters.

Fernando Po, 1,000 ft. ! Exsicc.—*Mann* 310 ; 1155.

43. **P. subherbacea** *Hiern*—F.T.A. 3 : 208. A nearly glabrous straggling shrub of forest undergrowth, with white flowers ¼ in. long crowded in terminal sub-capitate cymes.

Fernando Po ! Exsicc.—*Mann* 1420.

44. **P. subnuda** *Hiern*—F.T.A. 3 : 209. A glabrous shrub 4–6 ft. high, with narrow white flowers ¼ in. long fairly numerous crowded in a small pedunculate head-like cluster.

S. Nigeria : Calabar (Feb.) ! Exsicc.—*Mann* 2270.

45. **P. lophoclada** *Hiern*—F.T.A. 3 : 197. A stiffly-branched glabrous shrub with pale angled branchlets and small flowers crowded in small sessile terminal clusters.

Sierra Leone : Sugar Loaf Mountain (Apr., May) ! Exsicc.—*Barter* (no number). *Sc. Elliot* 3959 ; 5772.

46. **P. cornuta** *Hiern*—F.T.A. 3 : 198. A glabrous undershrub with small flowers few in short terminal cymes.

Fernando Po ! Exsicc.—*Mann* 1429.

47. **P. nigrescens** *De Wild.* Pl. Bequaert. 2 : 393. A shrub with small white flowers.

French Guinea : Guerzé country, between Boola and Moribadu (Mar.) ! Exsicc.—*Chev.* 20938 ; 20940.

48. **P. brachyantha** *Hiern*—F.T.A. 3 : 196. A nearly glabrous shrub 6 ft. high with very small white flowers in a loose slender-branched terminal cyme.

Fernando Po ! Exsicc.—*Mann* 1423.

49. **P. aledjoensis** *De Wild.* var. **glabra** De Wild. Pl. Bequaert. 2 : 330. A shrub with slender branchlets, glabrous or brown-tomentose when young.

French Guinea : Guerzé country, foot of Mt. Boola, at Yagadou, 2,300 ft. (Mar.) ! Exsicc.—*Chev.* 20929.

50. **P. brachyanthoides** *De Wild.* Pl. Bequaert. 2 : 337. *P. brachyantha* A. Chev. Bot. 340, not of Hiern. Shrub or small tree with white flowers.

Ivory Coast : Agniéby Valley, Makougnié (Jan.) ! Sanvi, Apouassou to Soubiré (Mar.) ! Exsicc.—*Chev.* 17108 ; 17801.

51. **P. setacea** *Hiern*—F.T.A. 3 : 197. *P. leptophylla* Hiern—F.T.A. 3 : 200. A glabrous shrub with pale green many-nerved leaves, more or less straggling in forest undergrowth, with very small white flowers numerous in a loose branching cyme and bright red succulent berries.

S. Nigeria : Oban ! Cameroons Mt. : Buea and vicinity, 4,000 ft. (Jan., Feb.) ! Fernando Po (fr. Nov.) ! Also in French Cameroons. Exsicc.—*T. Vogel* 167. *Mann* 1191. *Dalz.* 8208. *Dunlap* 21. *Talb.* 2024.

52. **P. ceratalabastron** *K. Schum.* in Engl. Bot. Jahrb. 33 : 362. *P. alatipes* Wernham.

S. Nigeria : Oban ! Eket ! Victoria ! Also in French Cameroons. Exsicc.—*Talb.* 241. *Preuss* 1271.

### *Imperfectly Known Species.*

**P. Brassii** *Hiern*—F.T.A. 3 : 204.

Gold Coast : Cape Coast ! Exsicc.—*Brass* (no perfect flowers seen).

**P. corallifera** *A. Chev.* Bot. 340, name only ; De Wild. Pl. Bequaert. 2 : 354 (descr.).

Ivory Coast : various loc. Exsicc.—*Chev.* 17416 ; 17425 ; 17431 ; 17462 (not seen in Herb. Chev.).

**P. epiphytica** *Mildbr.* in Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1910–11, 2 : 194, name only. An epiphytic shrub (in fruit only).

Fernando Po: 2,400–3,000 ft. (fr. Aug.)! Exsicc.—*Mildbr.* 6433.

**P. erythropus** *K. Schum.* in Engl Bot. Jahrb. 28 : 92. Undershrub up to 12 ft. high.
Cameroons Mt.: above Buea, 6,000 ft. (fr. Oct.)! Exsicc.—*Preuss* 1044.

**P. longituba** *A. Chev.* Bot. 342, name only; De Wild. Pl. Bequaert. 2 : 382 (descr.).
Ivory Coast: Lower Comoé. Excicc.—*Chev.* 17541 (not seen in Herb. Chev.).

**P. portonovensis** *De Wild.* Pl. Bequaert. 2 : 405.
Dahomey: Porto-Novo. Adjara. Exsicc.—*Chev.* 22745; 22902.

**P. refractiloba** *K. Schum.* in Engl. Bot. Jahrb. 28 : 99.
S. Nigeria: Johann-Albrechtshöhe. Exsicc.—*Staudt* 932 (not seen in Berlin Herb.).

## 54. **TRICHOSTACHYS** Hook. f.—F.T.A. 3 : 226.

Flowers in spikes; leaves rounded or slightly pointed at the apex:

Leaves broadly obtuse at the base, oblong-obovate-elliptic, 10–15 cm. long, 5–7 cm. broad, with about 8 pairs of oblique lateral nerves, pubescent below only on the nerves; spikes shortly pedunculate, cylindric, about 7 cm. long .. 1. *petiolata*

Leaves acutely cuneate at the base; narrowly obovate, about 15 cm. long and 6 cm. broad, glabrous below, with about 7 pairs of looped and repeatedly arched lateral nerves; spikes interrupted, about 4 cm. long .. .. .. 2. *interrupta*

Flowers capitate, heads subsessile; leaves acutely acuminate, long-attenuated to the base, gradually acute at the apex, 12–16 cm. long, 4–6 cm. broad, long-pilose on the midrib below, sparingly setulose above, with about 8 pairs of arched lateral nerves; petiole 1·5 cm. long, pilose; stipules rather long and sheathing, with filiform tips; calyx-lobes linear, ciliate .. .. .. .. .. .. .. 3. *Talbotii*

1. **T. petiolata** *Hiern*—F.T.A. 3 : 227. Herbaceous half-woody plant with rather stout hairy stem a few inches high, and small flowers in dense pubescent spikes.
S. Nigeria: Cameroons R. (Jan.)! Exsicc.—*Mann* 721.

2. **T. interrupta** *K. Schum.* in Engl. Bot. Jahrb. 33 : 360. *T. Krausiana* Wernham. A low undershrub with compressed pubescent branches and small flowers in short pilose spikes.
S. Nigeria: Oban, in marshy places! Barombi! Exsicc.—*Talb.* 1045. *Preuss* 466.

3. **T. Talbotii** *Wernham* in Cat. Talb. Nig. Pl. 55. A shrub or undershrub with woody terete stem (? unbranched) densely hairy when young, and flowers ⅓ in. long in a dense terminal hirsute head.
S. Nigeria: Oban! Exsicc.—*Talb.* 1041; 1368.

## 55. **GRUMILEA** Gaertn.—F.T.A. 3 : 215.

Inflorescence cymose:

Midrib and young shoots pubescent; leaves obovate to elliptic, shortly and broadly acuminate, 10–18 cm. long, 6–8 cm. broad, with about 15 pairs of lateral nerves; petiole up to 3·5 cm. long; calyx truncate; corolla 7–8 mm. long; anther-tips exserted; fruits small, 4 mm. diam. .. .. .. .. 1. *articulata*

Midrib and young shoots glabrous:

Cymes lax and divaricate; leaves oblong-elliptic, long-acuminate, 10–20 cm. long, 4·5–7 cm. broad, reddish-brown when dry, with about 9–12 pairs of paler lateral nerves; petiole 1–2 cm. long; calyx spreading, undulate; corolla about 5 mm. long; anthers partly exserted; fruits depressed globose, ribbed, 4–5 mm. diam. 2. *venosa*

Cymes dense and small; leaves reddish-brown when dry, obovate-elliptic, broadly acuminate, 10–16 cm. long, 4·7 cm. broad; lateral nerves 10–14 pairs; inflorescence spreading; corolla short and stout; fruits nearly 1·5 cm. long, on pedicels about 1 cm. long .. .. .. .. .. .. .. 3. *Lehmbachii*

Inflorescence a sessile globose cluster; leaves variable in shape from narrowly obovate to suborbicular, not acuminate, 10–20 cm. long, up to 14 cm. broad, glabrous; lateral nerves 10–12 pairs; petiole 1–4 cm. long; calyx-limb submembranous, lobed; corolla-tube 4–5 mm. long, glabrous; anthers partly exserted; fruits fleshy, ribbed 4. *psychotrioides*

1. **Grumilea articulata** *Hiern*—F.T.A. 3 : 218. A shrub, more or less rusty-hairy, with soft-wooded branches and cymes of white flowers about ¼ in. long.
S. Nigeria: Epe! Lagos Colony! Calabar (Feb.)! Cross R. (Jan.–Mar.)! Exsicc.—*Barter* 3259. *Moloney. Johnston. McLeod.*

2. **G. venosa** *Hiern*—F.T.A. 3 : 217; Chev. Bot. 344, partly. A shrub with shining foliage, up to 15 ft. high, with small white flowers numerous in branched spreading paniculate cymes.
Ivory Coast: Assinie! S. Nigeria: Oban! Fernando Po (Dec.)! Extends to Gabon. Exsicc.—*Mann* 31; 254; 1440. *Talb.* 235; 2040. *Chev.* 16315.

[illegible]. **G. Lehmbachii** *K. Schum.* in Engl. Bot. Jahrb. 28 : 101. *Psychotria gabonica* A. Chev. Bot. 341, in greater part. A glabrous shrub or small tree in forest, with white flowers ¼ in. long crowded in rather dense branched short cymes, and red coffee-like berries ⅓ in. or more long crowned by the calyx, the leaves sometimes turning vinous-red in drying.
Sierra Leone: Yonibana (fr. Oct., Nov.)! Ivory Coast: several localities! S. Nigeria: Epe! Onitsha! Cameroons Mt.: Buea, etc., 2,000–4,000 ft. (Dec., Jan.)! Exsicc.—*Barter* 1246; 1260. *Mann* 2160. *N. W. Thomas* 4005; 4782. *Dunlap* 16; 222. *Lehmbach* 133. *Chev.* 17085; 17115; 17176; 17201; 17361; 17724; 17734; 17793; 19189 bis.

4. **G. psychotrioides** *DC.*—F.T.A. 3 : 216; Holl. 3 : 378; Chev. Bot. 344. A glabrous shining shrub with white flowers ¼–⅓ in. long in solitary sessile heads.
French Sudan: Sikasso (May)! Senegal: Niayes! French Guinea: Futa-Jallon, Dalaba! Sierra Leone: on mountains (May)! Bagroo R. (Apr.)! Sherbro! Ninia, Talla Hills (Feb.)! Sulimania (Mar.)! Ivory Coast: Tabou to Bériby! Dahomey: Atacora Mts., Tomba! Djougou to Pobégou! S. Nigeria: Onitsha and neighbourhood (Aug.)! Exsicc.—*T. Vogel* 24. *Barter* 1235. *Mann* 871. *Garrett. Sc. Elliot* 4873; 4928; 5349. (See Appendix).

## 56. CHASALIA Commers.—Benth. & Hook. f. Gen. Pl. 2 : 126 ; F.T.A. 3 : 196 (as section of *Psychotria*).

Leaves acute at the base :

Leaves with about 6 pairs of lateral nerves, oblong-elliptic :

Inflorescence pubescent ; flowers sessile or subsessile on the axes ; leaves oblong or oblong-lanceolate, long-acuminate, acute at the base, 7–10 cm. long, 3–4 cm. broad, glabrous ; corolla nearly 1 cm. long ; anthers nearly wholly exserted 1. *Afzelii*

Inflorescence glabrous ; flowers rather long pedicellate ; leaves oblong, long-acuminate, acute at the base, 8–14 cm. long, 3–4·5 cm. broad, glabrous ; corolla as above ; anthers half-exserted .. .. .. .. .. .. 2. *laxiflora*

Leaves with 15 or more pairs of lateral nerves, elongate-oblong-oblanceolate, shortly acuminate, about 25 cm. long and 4–6 cm. broad, thin, glabrous ; petiole 1–1·5 cm. long ; flowers sessile and crowded in a shortly pedunculate cyme ; calyx denticulate ; corolla 2 cm. long, glabrous .. .. .. .. .. .. 3. *elongata*

Leaves rounded at the base, with 7–9 pairs of spreading lateral nerves, 10–15 cm. long, 5–8 cm. broad, glabrous ; petiole 1 cm. long ; flowers in a lax cyme ; calyx saucer-shaped, denticulate ; corolla curved, 1·5 cm. long ; anthers slightly exserted 4. *cupularis*

1. **Chasalia Afzelii** *K. Schum.* in Engl. Bot. Jahrb. 23 : 469. *Psychotria Afzelii* Hiern—F.T.A. 3 : 205. A glabrous shrub with shining foliage, and white flowers with yellow centre, ⅓–½ in. long.
Sierra Leone : Bagroo R. (Apr.) ! Freetown, Leicester (Dec.) ! Njala (Sept.) ! Sherbro ! Kennema (Jan.) ! Yonibana (Nov.) ! Exsicc.—*Mann* 843. *Sc. Elliot* 3868 ; 5789a. *Deighton* 104. *N. W. Thomas* 4734 ; 4958 ; 7614.

2. **C. laxiflora** *Benth* in Hook. Nig. Fl. 416 ; Stapf 614. *Psychotria Ansellii* Hiern—F.T.A. 3 : 214. A glabrous shining climbing shrub, with waxy flowers crimson and orange-yellow, about ½ in. long, in terminal corymbs.
Sierra Leone ! Liberia : Grand Bassa ! Sino Basin ! Monrovia ! S. Nigeria : Calabar ! Exsicc.—*Ansell. Thomson* 105. *Whyte. Farmar* 348.

3. **C. elongata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with rather long leaves and red-purple tinged inflorescence of yellow flowers ¾ in. long.
Liberia : Dukwia R. (Oct., Nov.) ! Exsicc.—*G. P. Cooper* 33.

4. **C. cupularis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A climbing shrub, glabrous, with flowers ⅔ in. long (deep red when dried).
S. Nigeria : Oban ! Exsicc.—*Talb.* 233.

## 57. URAGOGA Linn. Gen. ed. 1 : 378.

Heads more or less long-pedunculate :

Peduncles very long (about 40 cm. or more), longer than the leaves, the heads pendulous surrounded by large bracts ; leaves obovate, 15–18 cm. long and 10–14 cm. broad, reddish-brown when dry, with about 10 pairs of lateral nerves ; petiole 5–6 cm. long ; stipules tomentose within the persistent base ; corolla tomentose within the throat .. .. .. .. .. .. .. .. .. .. 1. *Mannii*

Peduncles much shorter than the leaves :

Lateral nerves 12–20 pairs ; stems not rooting at the nodes ; leaves obovate or obovate-elliptic ; acutely cuneate at the base, up to 18 cm. long and 8 cm. broad ; puberulous or glabrous on the nerves below ; involucre about 1 cm. long ; fruits ellipsoid, about 7 mm. long, ribbed .. .. .. .. 2. *peduncularis*

Lateral nerves about 10 pairs ; stems procumbent, rooting at the nodes ; leaves narrowly obovate-oblong, broadly and shortly acuminate, 8–10 cm. long, 3–4 cm. broad, glabrous ; petiole about 5 mm. long ; involucre about 8 mm. long 3. *sphaerocrater*

Heads subsessile, globose, not surrounded by large bracts ; sepals pilose-ciliate ; leaves broadly oblong-oblanceolate, broadly triangular-acuminate, about 15 cm. long, 5–6 cm. broad, pubescent on the midrib above ; branches pilose, becoming glabrous 4. *hexamera*

Heads subsessile, surrounded by a large involucre of united bracts :

Involucre about 4–5 cm. long, glabrous, faintly nervose ; leaves obovate-elliptic, broadly and shortly acuminate, rather long-cuneate at the base, about 15 cm. long and 7 cm. broad, glabrous, with about 18 pairs of spreading lateral nerves ; stipules bilobed nearly to the middle, 2·5 cm. long .. .. .. .. 5. *biaurita*

Involucre 1·5 cm. long, leathery, glabrous ; leaves elongate-obovate, shortly acuminate, long-cuneate at the base, about 25 cm. long and 10 cm. broad, reddish-brown when dry, glabrous ; petiole 3–5 cm. long ; corolla glabrous, about 1·5 cm. long 6. *spathacea*

1. **Uragoga Mannii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Cephaelis Mannii* Benth. & Hook. f.—F.T.A. 3 : 225. *Camptopys Mildbraedii* K. Krause. A large-leaved shrub 15 ft. high with yellow flowers ⅔–1 in. long densely crowded in pedunculate heads 1½–2 in. in diameter.
S. Nigeria : Calabar ! Fernando Po, 2,000 ft. ! Also in Cameroons. Exsicc.—*Mann* 312. *Hewan.*

2. **U. peduncularis** *K. Schum.* in Engl. and Prantl Natürl. Pflanzenfam. 4, 4 : 120. *U. nutans* K. Krause. *Cephaelis peduncularis* Salisb. Parad. Lond. t. 99—F.T.A. 3 : 223. *Camptopus Mannii* Hook. f. Bot. Mag. t. 5755. *Psychotria bidentata* A. Chev. Bot. 340, partly, not of Hiern. A shrub 2–8 ft. high often straggling in forest undergrowth, with prominently nerved shining subcoriaceous leaves, small white flowers in rather flat heads 1 in. in diameter with an involucre of pale bracts, and small ribbed fruits white when ripe.
Senegal and Gambia to Gold Coast, common ! N. Nigeria : Abinsi (June) ! Cameroons Mt., 5,000 ft. (Jan.) ! Fernando Po (Jan., June) ! Extends to Congo, Prince's Island, Angola and Uganda. Exsicc.—

*Döllinger* 53. *T. Vogel* 9; 40; 62. *Barter* (no number). *Mann* 222. *Ingram.* *Sc. Elliot* 4291; 5810. *Cummins.* *Whyte.* *Farmar* 421; 435. *Dalz.* 635. *Collenette* 22. *Dunlap* 244. *Linder* 1221. *Debeaux-Chev.* 17665; 19179.

3. **U. sphaerocrater** *K. Schum.* in Schlechter Westafr. Kautschuk - Exped. 322, name only.
S. Nigeria: hills near Ibadan! Exsicc.—*Schlechter* 13015.

4. **U. hexamera** *K. Schum.* in Engl. Bot. Jahrb. 28: 104. A low shrub of forest undergrowth, sometimes creeping at the base.
S. Nigeria: Oban! Also in Cameroons. Exsicc.—*Talb.* (no number).

5. **U. biaurita** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Psychotria biaurita* A. Chev. Bot. 340. *Cephaelis condensata* A. Chev. A low shrub of forest undergrowth with involucrate heads of white or purplish-tinged flowers.
French Guinea: Guerzé country, between Lola and Nzo (Mar.)! Ivory Coast: Sanvi, between Apouassou and Soubiré (Mar.)! Dyola country, near Danané (Apr.)! Exsicc.—*Chev.* 17743; 20996; 21285.

6. **U. spathacea** *Hutch. & J. M. Dalz.* l.c., ined. *Cephaelis spathacea* Hiern—F.T.A. 3: 225. A shrub with rather large leaves, low in forest undergrowth or up to 12 ft. high, with small white flowers in involucrate heads, the inflorescence and leaves red-brown-tinged.
Ivory Coast: Bingerville, and environs! Middle Cavally, Hana stream, between Fort Binger and Mt. Niénokoué (July)! Tépo country, Grabo, in forest undergrowth (July)! Also in St. Thomas Island. Exsicc.—*Chev.* 15338; 19506; 19638.

## 58. GEOPHILA D. Don—F.T.A. 3: 220.

Flowers not surrounded by an involucre of leafy bracts:

Leaves reniform, as broad or broader than long, narrowly cordate at the base, 3–5·5 cm. broad, with about 11 nerves radiating from the base; petioles long and slender; flowers 1–3 together; calyx-lobes linear-subulate; corolla about 1 cm. long; fruits strongly ribbed, 1 cm. long .. .. .. .. .. 1. *lancistipula*

Leaves not reniform, more or less ovate or pointed, longer than broad:

Flowers solitary; leaves cordate, 2–5 cm. long, 5–7-nerved at the base, glabrous or shortly pubescent; petioles up to 5 cm. long; calyx-lobes subulate; corolla 1·5 cm. long; fruits ribbed, 6–8 mm. long .. .. .. .. 2. *uniflora*

Flowers several in a cluster, with long densely ciliate calyx-lobes; leaves ovate to obovate, rounded to cordate at the base, 3–5 cm. long, 2·5–4 cm. broad, pubescent; petiole villous; fruit fleshy .. .. .. .. .. .. 3. *hirsuta*

Flowers few together, sessile; calyx-lobes probably not ciliate; fruits ovoid-globose, 5 mm. long, glabrous; stems shortly pubescent; leaves ovate or ovate-elliptic, obtuse, rounded-subcordate at the base, 6–10 cm. long, 2·5–5·5 cm. broad, with about 4 pairs of lateral nerves, slightly pubescent on the nerves; petiole up to 2 cm. long, shortly hirsute .. .. .. .. .. .. 4. *liberica*

Flowers surrounded by large obovate leafy bracts:

Flower-heads on long slender peduncles; leaves ovate, deeply cordate at the base, rounded to subacute at the apex, 3·5–6 cm. long and 4–5 cm. broad, glabrous or nearly so; petiole up to 10 cm. long, densely pubescent on one side 5. *obvallata*

Flower-heads sessile or very shortly pedunculate; bracts broadly suborbicular, 1·5–2 cm. diam., densely ciliate; branchlets with 1 pair of leaves; leaves broadly ovate, obtuse, cordate at the base, 4–6 cm. long, 3–5 cm. broad, puberulous on the nerves below; petiole up to 6 cm. long, hirsute; fruits ellipsoid, ribbed, 7–8 mm. long .. .. .. .. .. .. .. .. .. 6. *cordiformis*

1. **Geophila lancistipula** *Hiern*—F.T.A. 3: 221. *G. reniformis* Hiern—F.T.A. 3: 220, not of D. Don. A prostrate herb, rooting at the nodes, with few white slender tubular flowers ½–⅔ in. long.
S. Nigeria: Akassa! Brass! Extends to Portuguese Congo. Exsicc.—*T. Vogel* 57. *Barter* 60.

2. **G. uniflora** *Hiern*—F.T.A. 3: 221. *G. reniformis* A. Chev. Bot. 346, not of D. Don. Like the last, with smaller leaves of different shape, white waxy solitary flowers ½ in. long, and red succulent fruits.
Ivory Coast: several localities! Gold Coast: fairly common on forest floor! N. Nigeria: Nupe! S. Nigeria: Lagos Colony! Also in Angola and Upper Belgian Congo. Exsicc.—*Barter* 1240. *Punch* (no number). *Johnson.* 455. *Farmar* 543. *Chev.* 16558; 16674 bis; 16674 ter; 17789; 19221 bis; 19385; 21792; 21822; 22269; 22420. (See Appendix).

3. **G. hirsuta** *Benth.*—F.T.A. 3: 221; Chev. Bot. 345. *G. pilosa* A. Chev. A prostrate creeping hairy plant of the forest floor, with white flowers clustered, and orange or red fleshy fruits.
French Guinea: Kouria (Dec.)! Sierra Leone: Kennema! Liberia: Dukwia R. (Oct., Nov.)! Ivory Coast: common! Gold Coast: Kwahu (Mar.)! Apapam, E. Prov. (Aug.)! S. Nigeria: Akassa (Aug.)! Brass! Extends through Ubangi-Shari to Uganda. Exsicc.—*T. Vogel* 44. *Barter* (no number). *Johnson* 659. *Chipp* 557. *Lane-Poole* 446. *G. P. Cooper* 41. *Chev.* 14883; 15383; 17789 bis; 19222 bis; 19379.

4. **G. liberica** *A. Chev.* Bot. 345, name only. A semi-prostrate herb.
Ivory Coast: Middle Cavally, Tébo and neighbourhood (fr. July)! Exsicc.—*Chev.* 19382.

5. **G. obvallata** *F. Didr.*—F.T.A. 3: 222; Chev. Bot. 345. *G. Afzelii* Hiern; Chev. Bot. 344. Stems creeping, rooting at the nodes, pubescent on the young parts, becoming glabrous, with white flowers ⅓ in. long 2–6 together in a hemispherical cup-shaped involucre; on the forest floor.
Senegal! Sierra Leone to S. Nigeria and Fernando Po! Extends to Angola and Prince's Island. Exsicc.—*Heudelot* 602. *Barter* 4. *Mann* 173. *Sc. Elliot* 3936; 4240. *Millen* 6. *Cummins* 67, 264. *Macgregor* 305. *Chipp* 155. (See Appendix).

6. **G. cordiformis** *A. Chev.* Bot. 344. *G. lutea* A. Chev. Bot. 345. A creeping herb with yellow or red fruits.
Liberia: Du River! Dukwai River! Ivory Coast: Agnióby Valley, Attéou (Jan.)! Attié, between the Lagoon Poteau and the Mé! Middle Cavally, Tébo! Grabo, Mt. Copé! Exsicc.—*Chev.* 17198; 17437; 19386; 19692. *Linder* 183. *Cooper* 50.

## 59. OTOMERIA Benth.—F.T.A. 3: 49.

Leaves rounded at the base, lanceolate, very shortly petiolate, 5–10 cm. long, 1·5–3 cm. broad, pilose with weak hairs on both surfaces or sometimes glabrous; stems pilose; flowers few, in elongated spikes; ovary ribbed; calyx-lobes linear-lanceolate, leafy, about 1 cm. long; corolla-tube slender, 2 cm. long, broader near the top, weakly setoso-pubescent outside; lobes oblong-elliptic, about 8 mm. long; fruit turbinate, about 1 cm. long, ribbed .. .. .. .. .. .. .. 1. *dilatata*

Leaves more or less cuneate at the base, petiolate:

Stipules with several linear-filiform segments; leaves ovate or ovate-lanceolate, 4–5 cm. long, 1–2 cm. broad, thinly pubescent only on the nerves; petiole ciliate; flowers and fruits much smaller than above .. .. .. 2. *guineensis*

Stipules with up to 3 linear segments:

Stems climbing, glabrescent; leaves oblong-lanceolate, very acute at both ends, 5–10 cm. long, 2–3·5 cm. broad, slightly pubescent on the nerves below; petiole shortly pubescent; flowers in a terminal cluster; calyx-lobes leafy, broadly lanceolate, about 8 mm. long; corolla-tube 2·5 cm. long, slightly pubescent, lobes 6–7 mm. long .. .. .. .. .. .. .. .. 3. *Batesii*

Stems very short from a rhizome, softly pubescent; leaves ovate-lanceolate, acute, 1·5–2 cm. long, 5–8 mm. broad, softly and shortly pubescent on both sides; calyx-lobes broadly lanceolate, 6 mm. long; corolla 2·5 cm. long, thinly pubescent, lobes 7 mm. long; young fruits softly pubescent .. .. .. 4. *tenuis*

1. **Otomeria dilatata** *Hiern*—F.T.A. 3: 50; Chev. Bot. 310. An erect more or less hirsute herb 2–3 ft. high, with scarlet flowers 1 in. long; moist localities.
French Sudan: Sikasso. French Guinea: Beyla (July)! Bouhong (June)! Kouria; Futa-Jallon, between Irébéléya and Timbo (Sept.). Sierra Leone: Jigaya (Sept.)! Liberia: Monrovia! Ivory Coast: Baoulé-Nord, between Marabadiassa and Gottoro (July)! N. Nigeria: Nupe! Abinsi (June)! Extends to E. Africa, Rhodesia and Angola. Exsicc.—*Barter* 1237. *Farmar* 355. *Dalz.* 751. *N. W. Thomas* 2503. *Collenette* 68.
2. **O. guineensis** *Benth.*—F.T.A. 3: 49; Stapf 609. Erect, more or less branched herb 1–2 ft. high, with rather small narrow white flowers under ½ in. long.
Liberia: Grand Bassa (July)! Sino Basin! Monrovia (Nov.)! Gold Coast: Ijang Forest Reserve! Cameroons Mt., Buea! Extends to Congo. Exsicc.—*T. Vogel* 39. *Ansell.* *McWilliam.* *Whyte.* *Lloyd Williams* 247. *Dunlap* 140. *Linder* 1558.
3. **O. Batesii** *Wernham* in Journ. Bot. 1916: 226. A wiry-stemmed twining plant, nearly glabrous, with slender tubular red flowers 1 in. or more long.
S. Nigeria: Degema! Also in S. Cameroons. Exsicc.—*Talb.* (no number).
4. **O. tenuis** *A. Chev.* Bot. 310, name only. A small herb a few inches high from a half-woody base, with slender white flowers about 1 in. long.
French Sudan: Sindou, in crevices of rocks (May)! Exsicc.—*Chev.* 866.

## 60. PENTAS Benth.—F.T.A. 3: 45.

Erect shrubs or herbs with hairy branches or stems; corolla 1·5–5·5 cm. long:

Corolla-tube up to about 1 cm. long or a little more, shortly pubescent:

Leaves oblanceolate, obtuse at the apex, 5–6 cm. long, about 1 cm. broad, minutely setulose on the nerves below, scabrid above; cymes pedunculate, several-flowered; calyx-lobes unequal, oblong, about 3 mm. long; ovary thinly pubescent; corolla-tube rather wide, setulose outside; stipules shortly divided into linear segments 1. *arvensis*

Leaves ovate, acuminate, acute, 6–8 cm. long, 3–4 cm. broad, with very conspicuous shortly pubescent parallel nerves below; stipules divided into several linear segments about 1 cm. long; inflorescence rather dense and many-flowered; calyx-lobes linear, 5 mm. long .. .. .. .. .. .. 2. *occidentalis*

Corolla-tube about 5 cm. long, pubescent; lobes 5 mm. long; stigma slightly divided; leaves subsessile, lanceolate, subacute, 6–8 cm. long, 2–3 cm. broad, minutely pubescent on the few lateral nerves and on the surface below; stipules divided nearly to the base into 3 linear segments; inflorescence dense and head-like, the calyces crowded into a globose mass .. .. .. .. .. 3. *globifera*

Twining; stems glabrescent:

Corolla about 1 cm. long, glabrous; leaves lanceolate, acute at both ends, 5–7 cm. long, 2–2·5 cm. broad, pubescent on the nerves below; stipules divided into thread-like segments; inflorescence very small; calyx-lobes short and linear 4. *parviflora*

Corolla 3–4 cm. long, puberulous, with broad obovate lobes; leaves ovate or ovate-elliptic, rounded to a shortly cuneate base, acute, 5–10 cm. long and 3–5 cm. broad, thin, puberulous on the nerves below; stipules as above; inflorescence a dense cluster; calyx-lobes obovate, leafy up to 1·2 cm. long .. .. .. 5. *volubilis*

1. **Pentas arvensis** *Hiern*—F.T.A. 3: 47. Herbaceous stems 6–12 in. high from a woody base, appearing in tufts after burning, with white or pink or bluish flowers ⅓ in. long in terminal branched cymes.
N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft.; ? locality (Jan.)! Exsicc.—*Dent Young* 120. *Lely* P. 26.
2. **P. occidentalis** *Benth. & Hook. f. ex Hiern*—F.T.A. 3: 46. A shrub 3–6 ft. high, very rusty-pubescent, with rather dense cymes of flowers about ¾ in. long.
Cameroons Mt., 7,000–9,000 ft. (Jan., Feb., Nov.)! Exsicc.—*Mann* 1227; 1993. *Dalz.* 8306. *Preuss* 664. *Kalbreyer* 126. *Mildbraed* 10884. *Maitland* 476.
3. **P. globifera** *Hutch.* in Kew Bull. 1921: 374. An undershrub with brownish-hairy sub-quadrangular branches and heads of narrow tubular flowers 2–3 in. long.
N. Nigeria: Bauchi Plateau, Mongu, 4,300 ft. (July)! Exsicc.—*Lely* 386.
4. **P. parviflora** *Benth.*—F.T.A. 3: 47. A twining shrub with glabrescent branches rusty-hairy when young, and small bluish flowers in small cymes.
Gold Coast: Accra! Exsicc.—*T. Vogel* (no number).
5. **P. volubilis** *K. Schum.* in Engl. Bot. Jahrb. 23: 421.
S. Nigeria: Barombi (Sept.)! Also in French Cameroons. Exsicc.—*Preuss* 471.

## 61. VIRECTA Afzel.—F.T.A. 3 : 47.

Leaves broadly lanceolate to ovate-lanceolate :

Stipules in pairs but widely separated, linear ; stems usually clothed with long slender spreading hairs and with shorter crisped hairs ; leaves broadly lanceolate, acute, 4–8 cm. long, 1·5–2·5 cm. broad, loosely pilose with very long hairs on both surfaces ; flowers in dense terminal clusters ; calyx-lobes linear-filiform, long-ciliate ; anthers long-exserted .. .. .. .. .. .. .. 1. *multiflora*

Stipules united at the base but divided into 3–4 setaceous teeth ; stems procumbent, shortly pubescent ; leaves ovate-lanceolate, subobtuse, 2–3 cm. long, 1–1·5 cm. broad, very shortly pubescent only on the nerves below ; flowers sessile in terminal clusters ; calyx-lobes ovate, green ; anthers hardly exserted .. .. 2. *setigera*

Stipules united into one, subulate, about 3 mm. long ; stems shortly pubescent ; leaves ovate-lanceolate, subacute, 4–6 cm. long, 2–3 cm. broad, slightly pubescent on the nerves ; flowers in clusters but distinctly pedicellate ; calyx-lobes spathulate, leafy, shortly ciliate at the apex ; anthers shortly exserted ; fruit setulose, the endocarp often persisting and smooth .. .. .. .. .. 3. *procumbens*

Leaves linear-oblanceolate, about 2·5 cm. long, glabrous above, with about 4 pairs of ascending pubescent nerves below ; stems pubescent ; stipules subulate ; calyx-lobes subulate ; ovary appressed-pubescent ; fruit globose .. 4. *heteromera*

1. **Virecta multiflora** *Smith*—F.T.A. 3 : 48 ; Stapf 609 ; Chev. Bot. 309. Herbaceous, 2–4 ft. high, with pale spreading hairs and corymbs of slender white funnel-shaped flowers about ½ in. long.
French Sudan : Fantiéla. French Guinea and Sierra Leone : common ! Liberia : Kakatown ! Ivory Coast : several localities ! Gold Coast : West. Prov., Bou (Nov.) ! N. Nigeria : Lokoja, Patti (Nov.) ! S. Nigeria : various localities ! Extends to Uganda and Congo. Exsicc.—*Barter* 535 ; 1792. *Barry. Sc. Elliot* 3934 ; 3981 ; 4254. *Whyte. Talb.* 3015. *Pobéguin* 778.
2. **V. setigera** *Hiern*—F.T.A. 3 : 48. A creeping plant rooting at the lower nodes, shortly pubescent, with pale underleaf, and clusters of small white flowers.
Sierra Leone : Bagroo R. (Apr.) ! Gola Forest (Nov.) ! Fernando Po (Jan.) ! Also in Cameroons. Exsicc.—*Barter* 2048. *Mann* 215 ; 874. *Deighton* 372 ; 1571.
3. **V. procumbens** *Smith*—F.T.A. 3 : 48 ; Stapf 609 ; Chev. Bot. 310. Erect or sometimes creeping herb, more or less hairy, with clusters of slender white flowers about ⅓ in. long.
Sierra Leone : common ! Liberia : Kakatown ! Du R. (Aug.) ! Dukwia R. (Oct., Nov.) ! Gold Coast : Axim ! S. Nigeria : ? locality ! Oban ! Extends to Congo. Exsicc.—*G. Don. Barter* 468. *Mann* 812. *Sc. Elliot* 3956. *Whyte. Linder* 263. *G. P. Cooper* 6 ; 18.
4. **V. heteromera** *K. Schum.* in Engl. Bot. Jahrb. 23 : 422. Erect much-branched herb up to 1 ft. high.
S. Nigeria : Bibundi, west of Cameroons Mt. (fr. Nov.) ! Also in French Cameroons. Exsicc.—*Mildbr.* 10659.

## 62. OLDENLANDIA Plumier—F.T.A. 3 : 51.

* Flowers axillary, solitary or fasciculate or in few-flowered axillary or terminal cymes, usually more or less pedicellate :

† Leaves linear or very narrowly linear-lanceolate, at most 5 mm. or so broad :

Corolla-tube 1 cm. long :

Corolla-lobes linear-subulate ; leaves linear, 2–4 cm. long, glabrous ; calyx-lobes subulate-lanceolate, hardly 1 mm. long ; fruits ellipsoid-globose 4–5 mm. long 1. *senegalensis*

Corolla-lobes ovate to obovate, apiculate ; leaves as above ; calyx-lobes subulate ; fruit globose, about 4 mm. long .. .. .. .. .. 2. *grandiflora*

Corolla-tube less than 5 mm. long :

‡ Flowers on simple pedicels or in a loose terminal cyme :

Flowers axillary :

Flowers sessile or shortly pedicellate :

Flowers solitary or subsolitary, sessile or subsessile ; calyx-lobes twice as long as the ovary ; leaves slightly scabrid ; fruits ribbed .. .. 3. *abyssinica*

Flowers fasciculate, shortly pedicellate ; calyx-lobes triangular, about as long as the ovary ; leaves scabrid.. .. .. .. .. .. 4. *capensis*

Flowers on long slender pedicels ; corolla about as long as the calyx ; leaves linear-lanceolate ; fruits about 4 mm. long .. .. 5. *lancifolia*

Flowers subcymose at the ends of the shoots :

Stipules truncate, with subciliate margin, not divided into filiform segments ; leaves linear ; flowers very numerous .. .. .. .. 6. *herbacea*

Stipules divided into narrow or filiform segments :

Stipules with only two lateral filiform segments adnate to the base of the leaf-blade ; flowers few, on long slender pedicels especially in fruit 7. *confusa*

Stipules with central filiform segments free from the leaf-blade ; flowers more numerous, on short pedicels .. .. .. .. .. 8. *virgata*

‡‡ Flowers few on a common axillary peduncle ; pedicels filiform ; leaves linear, glabrous or slightly scabrid ; corolla about as long as the calyx ; fruits about 2 mm. long .. .. .. .. .. .. .. 9. *corymbosa*

†† Leaves spathulate-oblanceolate, about 5 mm. long ; pedicels about 5 mm. long ; fruit very small .. .. .. .. .. .. .. .. 10. *caespitosa*

††† Leaves broadly lanceolate to ovate-lanceolate, or elliptic, usually 1 cm. broad or more :

Flowers pedicellate, in slender axillary or terminal cymes :
  Corolla nearly 3 times as long as the calyx ; stems very slender and wiry ; stipules and leaf-base ciliate .. .. .. .. .. .. 11. *decumbens*
  Corolla at most twice as long as the calyx ; stems rather thick and fleshy ; stipules and leaf-base not ciliate, the former entire or bidentate .. 12. *macrophylla*
Flowers very shortly pedicellate, in axillary fascicles ; leaves elliptic or ovate-elliptic, 3–5-nerved at the base, 1·5–2·5 cm. long, up to 1·3 cm. broad, minutely setulose on the midrib above ; ovary and calyx-lobes pubescent 13. *goreensis*

** Flowers in a terminal lax-branched cyme, the branches spreading at right angles ; capsule septicidal, the ribs persisting and straw-coloured ; leaves obovate to ovate-elliptic, acute, 6–10 cm. long, 2–4 cm. broad, glabrous or pubescent on the nerves below, the latter about 8 pairs and looped ; stipules setose-linear ; corolla-tube about 1 cm. long .. .. .. .. .. .. .. 14. *Peltospermum*

1. **Oldenlandia senegalensis** *Hiern*—F.T.A. 3 : 56 ; Holl. 3 : 353 Chev. Bot. 312. An erect rather slender branched annual 1–2 ft. or more high, with small whitish flowers (light brown on the outside in a loose cyme.

Common in savannah grass, etc., from Senegal to N. Cameroons, extending to E. Sudan, Abyssinia and E. Africa ! Exsicc.—*Sieber. Roger. Barter* 956. *Brown-Lester* 3. *Sc. Elliot* 5087b ; 5168. *Johnson* 491. (See Appendix).

2. **O grandiflora** *Hiern*—F.T.A. 3 : 57 ; Chev. Bot. 311. Habit of the preceding but larger and with attractive pink (sometimes white) flowers.

Senegal, Gambia and French Sudan : a common field plant ! Togo : Sokode ! N. Nigeria : common ! S. Nigeria : Lagos Colony, ? locality ! Extends to Cameroons, E. Sudan and Abyssinia. Exsicc.—*Roger Perrottet* and others. *Barter* 856. *Ingram. Brown-Lester* 64. *Rowland. Elliott* 27. *Dalz.* 223. *Kersting* 685. (See Appendix).

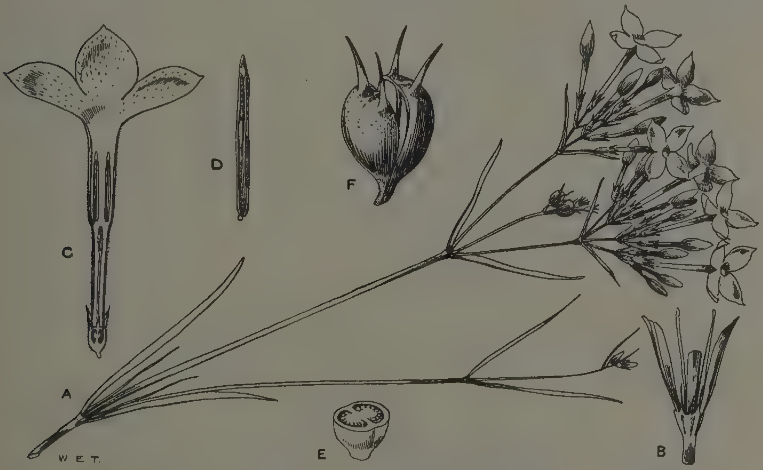

FIG. 214.—OLDENLANDIA GRANDIFLORA *Hiern* (RUBIACEAE).

A, flowering shoot. B, stipules. C, longitudinal section of flower. D, anther. E, cross-section of ovary. F, fruit.

3. **O. abyssinica** *Hiern*—F.T.A. 3 : 57. An erect annual, simple or branched, a few inches to 1 ft. high, woody at the base, with white flowers $\frac{1}{4}$–$\frac{1}{3}$ in. long.

Senegal : Mbidgem ! Dahomey : between Savé and Agouagon (May) ! N. Nigeria : Bauchi Plateau, Vom, 3,000–4,500 ft. ! Extends to Abyssinia, Upper Congo, E. Africa and Rhodesia. Exsicc.—*Herb. Franqueville. Dent Young* 116. *Chev.* 23598.

4. **O. capensis** *Linn. f.*—F.T.A. 3 : 62. *O. sabulosa* DC. ; Chev. Bot. 312. Herb of wet places, decumbent or semi-erect up to about 1 ft. high, with small white flowers.

Senegal. Sierra Leone : near Port Lokko (Apr.) ! Falaba (Mar.) ! N. Nigeria : Nupe ! Sokoto (Mar., Dec.) ! Bauchi Plateau, Mongu, 4,300 ft. (July) ! Taura (May) ! S. Nigeria : Lagos ! Extends to E. Sudan, E. Africa, Rhodesia, Angola and South Africa. Exsicc.—*Barter* (no number). *Sc. Elliot* 5169 ; 5876. *Moiser* 169. *Lely* 121 ; 440. *Dawodu* 373.

5. **O. lancifolia** *Schweinf.*—F.T.A. 3 : 61 ; Stapf 610 ; Chev. Bot. 312. A glabrous herb, erect or straggling, with small white (sometimes pink or lilac) flowers ; in moist places.

A fairly common weed throughout the area, and extending to E. Sudan, Rhodesia and Angola. Exsicc.—*Barter* 178 ; 1659 ; 1714. *Mann* 870. *Sc. Elliot* 5045 ; 5726. *Cummins. Whyte.*

**O. herbacea** *Roxb.* Fl. Ind. 1 : 445. *Hedyotis herbacea* Linn. *O. Heynei* G. Don—F.T.A. 3 : 59 ; Stapf 610 ; Holl. 3 : 353 ; Chev. Bot. 311 (incl. var. *djalonis* A. Chev.). An erect much-branched slender weed up to 1 ft. high, with small white flowers.

Common in fields throughout the area, and extending through the Sudan to the Eastern Tropics, also to Congo, E. Africa and S. Tropical Africa. Exsicc.—*Don. T. Vogel* 135. *Barter* 873. *Moloney. Rowland. Dawodu* 357. *Whyte. Chev.* 2116 ; 18708.

7. **O. confusa** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 :ined. *O. effusa* Hiern—F.T.A. 3 : 59, partly, not of

Oliv. Erect slender-branched herb, 1–2 ft. high, woody at the base, with narrow-tubular dul'-red or whitish flowers, ¼ in. long.

Senegal: ? locality! French Guinea: Kouroussa (Sept.)! Togo: Badja (Mar.)! Also in S. Cameroons. Exsicc.—*Heudelot*. *Pobéguin* 436. *Schlechter* 12978.

8. **O. virgata** *DC.*—F.T.A. 3 : 59, partly; Chev. Bot. 313. Erect branched herb, a few inches to 1 ft. or more high, with small pink or whitish flowers.

French Guinea: Futa-Jallon, between Ditinn waterfall and Dalaba (Sept.). Gold Coast: Accra and neighbourhood! Shai Plains (Mar.)! Togo: Lome! Dahomey: Kotonu. S. Nigeria: Lagos! Idah! Also in E. Sudan and Zambesi Basin. Exsicc.—*T. Vogel*. *Ansell*. *Moloney*. *Johnson* 357. *Dalz*. 1048. *Warnecke* 174.

9. **O. corymbosa** *Linn.*—F.T.A. 3 : 62; Chev. Bot. 311. An erect or diffuse branched herb, nearly glabrous, up to 1 ft. high or more, with small white or lilac flowers; on paths, etc.

French Sudan: Oualia; Bafaga. Senegal: ? locality! French Guinea: Kouria. Sierra Leone: Rowala (July)! Njala (Oct.)! Makump (Aug.)! Gold Coast: Accra! Krobo Plains (Dec.)! Shai Plains (Jan.)! N. Nigeria: Sokoto! Lokoja! Abinsi (Dec.)! Bauchi Plateau, Vom, 3,000–4,500 ft.! S. Nigeria: Idah (Sept.)! Akassa! Fernando Po (Nov.)! Extends to E. Sudan, Abyssinia, E. Africa, Congo and S. Trop. Africa. Exsicc.—*T. Vogel* 9; 67; 201. *Johnson* 492. *Farmar* 61. *Dalz*. 649. *Dent Young* 111. (See Appendix).

10. **O. caespitosa** *Hiern*—F.T.A. 3 : 61; Stapf 610; Chev. Bot. 310. A small prostrate herb with very small white axillary flowers.

Liberia: Cape Palmas (July)! Exsicc.—*T. Vogel* 51.

11. **O. decumbens** *Hiern*—F.T.A. 3 : 54; Chev. Bot. 311. A glabrous decumbent plant, straggling amongst grass, etc., with blue flowers.

Ivory Coast: Agniéby Valley, Dabou. Gold Coast: Anaji (Feb.)! Togo: Lome! S. Nigeria: Lagos, Ikoyi, etc. (Mar.)! Agolo! Aguku! Ogwashi (Dec.)! Calabar (Apr.)! Cameroons R. (Jan.)! Extends to Angola, E. Africa, Rhodesia and Transvaal. Exsicc.—*Barter* 2181. *Mann* 2229. *Moloney*. *Millen* 150.

12. **O. macrophylla** *DC.*—F.T.A. 3 : 63; Chev. Bot. 312. A straggling half-succulent herb of wet and muddy places, with white or pink flowers less than ¼ in. long.

Gambia. Sierra Leone: several localities! Ivory Coast: Yapo (Oct.)! Grabo; Toumodi, etc. Gold Coast: Ancobra Junction (Jan.). Prah. R., Ashanti! Dahomey: Lower Ouémé R., Aguégué, Savé, etc. N. Nigeria: Sokoto (June)! S. Nigeria: Angiama! Lagos Colony! Abeokuta! Akassa! Extends to E. Sudan, Abyssinia and Arabia, also Congo, E. Africa and S. Trop. Africa. Exsicc.—*T. Vogel* (no number). *Barter* 91; 3365. *Rowland*. *Sc. Elliot* 5493; 5863. (See Appendix).

13. **O. goreensis** *Summerhayes* in Kew Bull. 1928 : 392. *Hedyotis goreensis* DC. *O. trinervia* Hiern—F.T.A. 3 : 63, not of Retz.; Chev. Bot. 313. A decumbent herb with very small white or purple flowers crowded in head-like axillary or terminal fascicles, in damp localities.

French Sudan: Dendela (Mar.)! Sikasso. Senegal. Sierra Leone: Makump (July)! Pendembu (July)! Konta, Kasokora-Bumban (Aug.)! Ivory Coast: Baoulé-Nord, between Manikro and Tiégouakro. Togo: Lome! N. Nigeria: Nupe! Kontagora (Nov.)! Bauchi Plateau, Vom, 3,000–4,500 ft.! Extends to E. Sudan, and to Angola, Uganda, E. Africa and Rhodesia. Exsicc.—*Barter* 1241. *Dalz*. 215. *N. W. Thomas* 833; 938. *Chev*. 633. *Warnecke* 239. (See Appendix).

14. **O. Peltospermum** *Hiern*—F.T.A. 3 : 53; Stapf 609; Chev. 312. A glabrous straggling or climbing soft-wooded shrub with blue or coral-red flowers ⅓ in. long, and small globose ribbed fruits.

Senegal! French Guinea: Kouria. Sierra Leone: common in forests! Liberia: Kakatown! Ivory Coast: common. Gold Coast: Aburi (June)! Essiama (fr. Oct.)! Akroful (Nov.)! N. Nigeria: Abinsi (June)! S. Nigeria: Oban! Fernando Po (Nov., Dec.)! Extends to Gabon and Prince's Island, and to Shari-Chad. Exsicc.—*Heudelot* 628. *T. Vogel* 74. *Barter* 2059. *Mann* 58. *Sc. Elliot* 3890; 4176. *Johnson* 971. *Whyte*. *Dalz*. 632.

### 63. **HEKISTOCARPA** Hook. f.—F.T.A. 3 : 65.

Stems pubescent; leaves obovate to broadly oblanceolate, acutely acuminate, acute at the base, 8–14 cm. long, 3–6 cm. broad, appressed-setulose-pubescent on both surfaces; petiole about 1·5 cm. long, setulose; stipules leafy, ovate-lanceolate, up to 1 cm. long; flowers very small; sessile in axillary secund sparsely branched cymes; calyx-teeth shortly subulate; ovary setulose; corolla glabrous, about twice as long as the calyx; anthers included .. .. .. .. .. *minutiflora*

**H. minutiflora** *Hook. f.* Ic. Pl. t. 1151—F.T.A. 3 : 65. A woody herb or more or less straggling undershrub.

S. Nigeria: Calabar R. (Feb.)! Also in Cameroons. Exsicc.—*Mann* 2314.

### 64. **PENTANISIA** Harv.—F.T.A. 3 : 131.

Leaves narrowly oblanceolate, acute, 1–2·5 cm. long, glabrous; cymes shortly pedunculate, rather few-flowered; calyx-lobes very unequal; corolla-tube narrow and slender-bright blue, thinly and minutely setulose outside; ovary densely white-setulose, tomentose .. .. .. .. .. .. .. .. *Schweinfurthii*

**P. Schweinfurthii** *Hiern*—F.T.A. 3 : 131. Habit of the last, usually only a few inches high, with narrow flowers ½ in. long bright blue turning violet, in almost head-like cymes.

N. Nigeria: Bauchi Plateau, Naraguta! Extends to E. Sudan and E. Africa. Exsicc.—*Hill* 29. *Lely* 3; P. 19.

### 65. **NEOBAUMANNIA** Hutch and J. M. Dalz. in Kew Bull. 1931 ined. (*Baumannia* K. Schum. in Engl. Bot. Jahrb. 23 : 455 (1896), not of D.C.)

Stems simple from a woody base, shortly pubescent; leaves sessile, broadly lanceolate, acute, 5–10 cm. long, 2–3 cm. broad, with several oblique nerves, puberulous on the nerves below; stipules divided into 5 subulate segments; flowers small and numerous, in a terminal corymb; calyx-lobes 4, one enlarged; corolla 3 mm. long; fruit dehiscent, the valves deciduous .. .. .. .. .. *hedyotoidea*

**N. hedyotoidea** *K. Schum.* l.c. 456. Stems 18 in. high, with small pale lilac or greenish flowers with one enlarged narrow whitish calyx-lobe; habitat amongst rocks.

Togo: Agome Mts., near Misahöhe (Oct.)! Basari, Aledjo-Kadara, 2,100 ft. Exsicc.—*Baumann* 323. *Kersting* 119.

### 66. **ARGOSTEMMA** Wall.—F.T.A. 3 : 44.

Leaves obliquely elliptic-lanceolate, 2–3·5 cm. long, up to 1·3 cm. broad, pilose with long weak hairs above and on the midrib below; flowers from solitary to about 5 in a loose cyme ; pedicels pubescent, up to 1·3 cm. long ; calyx slightly toothed ; corolla divided nearly to the base, lobes oblong-elliptic, 5–6 mm. long ; anthers long-exserted, opening by pores .. .. .. .. .. .. .. 1. *pumilum*

Leaves oblanceolate, subacute, 2–4·5 cm. long, 0·5 cm. broad, slightly pilose below ; flowers up to 5 in each cyme ; pedicels glabrous ; calyx undulate ; corolla divided almost to the base, lobes broadly lanceolate, 6 mm. long ; anthers long-exserted 2. *africanum*

1. **A. pumilum** *Benn.*—F.T.A. 3 : 44, partly. A small herb 2–3 in. high, with white flowers and tuberous root ; habitat on wet rocks.
Sierra Leone : Waterloo ! Kennema ! Banikoro (Oct.) ! Bumban (Aug., Oct.) ! Seli R. (Oct.) ! Exsicc.—*Afzelius.* *Lane-Poole* 145 ; 465. *N. W. Thomas* 2950 ; 3115 ; 3143. *Deighton* 1308.

2. **A. africanum** *K. Schum.* in Engl. Bot. Jahrb. 23 : 423. Similar to the preceding.
S. Nigeria : Oban ! Cameroons Mt. : Tiko (Oct.) ! Also in Spanish Guinea. Exsicc.—*Talb.* 345. *Schlechter* 15793.

## 67. DIODIA Gronov.—F.T.A. 3 : 230.

Leaves broadly linear or oblanceolate, without visible lateral nerves, about 3 cm. long, glabrous or setulose on the margin ; internodes very short, the stipules usually overlapping, with linear-subulate segments ; fruits about 8 mm. long 1. *vaginalis*

Leaves-oblanceolate to ovate-elliptic, with distinct lateral nerves :

Flowers solitary or subsolitary ; fruit-body 5–6 mm. long ; leaves lanceolate to elliptic, about 3 cm. long and 1·5 cm. broad, setulose or glabrous ; internodes usually distinct ; stipules short, with linear-subulate segments .. .. .. 2. *maritima*

Flowers several together ; fruit-body at most 4 mm. long ; leaves more or less as in preceding ; segments of stipules filiform .. .. .. .. .. 3. *scandens*

1. **Diodia vaginalis** *Benth.*—F.T.A. 3 : 232 ; Stapf 614. A half-succulent herb prostrate and trailing on sandy shores, with crowded leaves and axillary white flowers ½ in. long.
Sierra Leone : near York (Jan.) ! Freetown ! Liberia : Grand Bassa (July) ! Monrovia (Nov.) ! Gold Coast : Half Assinie (July) ! S. Nigeria : Akassa (Aug.) ! Brass ! Exsicc.—*T. Vogel* 21 ; 68. *Barter* 50. *Smythe.* *Chipp* 273. *Deighton* 2026. *Linder* 1431.

2. **D. maritima** *Thonn.*—F.T.A. 3 : 231 ; Chev. Bot. 347. Creeping in sand or trailing with ascending branches and small white or lilac axillary flowers.
Senegal : ? locality ! Niayes ! Sierra Leone : Ruka, Mahela (Dec.) ! Yungeru (Jan.) ! Mano Salija (Nov.) ! Banana Islands. Ivory Coast : Sassandra Port (by the sea) ! Dahomey : Kotonu (Apr.) ! S. Nigeria : Lagos, Victoria Beach, etc. (May) ! Akassa (Aug.) ! Brass ! Extends to Angola, also in India and tropical America. Exsicc.—*Heudelot* 572. *T. Vogel* 2. *Barter* 1835. *Mann* 465. *Sc. Elliot* 3942. *Dawodu* 359. *Farmar* 102. *Dalz.* 1380. *Debeaux* 164. (See Appendix).

3. **D. scandens** *Swartz* Prod. Veg. Ind. Occ. 30. *D. breviseta* Benth.—F.T.A. 3 : 231 ; Stapf 614 ; Chev. Bot. 347. *D. rubricosa* Hiern. Trailing or scandent herb, rather scabrid, with strongly-nerved leaves and small white or pink flowers clustered in the axils.
Throughout tropical Africa, Madagascar, tropical America and West Indies. Exsicc.—*T. Vogel* 63 ; 84. *Barter* 1722 ; 2150. *Mann* 403. *Sc. Elliot* 4009. *Johnston* 97. *Whyte.* *Dalz.* 633 ; 1381. *Lely* 225. *Debeaux* 155. (See Appendix).

## 68. BORRERIA G. F. W. Meyer (*Spermacoce* Auct.—F.T.A. 3 : 233, partly).

Leaves about twice as long as broad, glabrous or slightly pubescent on the nerves below, ovate-lanceolate, 2–3·5 cm. long, 1–1·5 cm. broad, very thin ; stipular sheath very short, sparingly pilose ; flowers rather numerous at the nodes ; fruits very small, nearly glabrous .. .. .. .. .. .. .. 1. *ramisparsa*

Leaves linear to linear-lanceolate, 4 times as long as broad or more :

Leaves linear, with a very thick cartilaginous margin and thick prominent midrib, glabrous, 3–5 cm. long, 4–6 mm. broad, without visible lateral nerves ; stems rather softly hispid ; stipules pubescent outside, with several filiform segments about 0·6–1 cm. long ; flowers in terminal or subterminal heads surrounded by numerous long leaves .. .. .. .. .. .. .. .. .. 2. *radiata*

Leaves without cartilaginous margins and other characters not associated as above :

Flowers in successive axillary clusters, not confined to the top of the shoot :

Stems and usually the stipular sheaths glabrous :

Fruits glabrous :

Leaves with distinct lateral nerves, narrowly lanceolate, 7–9 cm. long, 1–1·5 cm. broad, glabrous ; stipular sheath about 7 mm. long, segments about 5 mm. long ; calyx-lobes about 4 mm. long, serrulate-scabrid on the margin ; corolla 1·5–2 cm. long ; anthers long-exserted .. .. .. 3. *compressa*

Leaves linear and without or with very indistinct lateral nerves, much paler below, 2–3 cm. long ; calyx-lobes very short .. .. .. 4. *stricta*

Fruits pubescent towards the apex ; leaves linear, 3–5 cm. long, with very indistinct lateral nerves, slightly pilose on the midrib below ; flower-clusters very small 5. *hebecarpa*

Stems pilose or pubescent and usually also the stipular sheaths :

Leaves pilose on the upper surface, linear, pilose on the nerves below, 3–5 cm. long, up to 6 mm. broad ; stamens long-exserted .. .. 6. *filiformis*

Leaves shortly scabrid on the upper surface, lanceolate, acute, 5–8 cm. long :

Stems densely and shortly puberulous ; stipular segments very long and thread-like ; fruits scabrid-pubescent, becoming densely clustered 7. *stachydea*

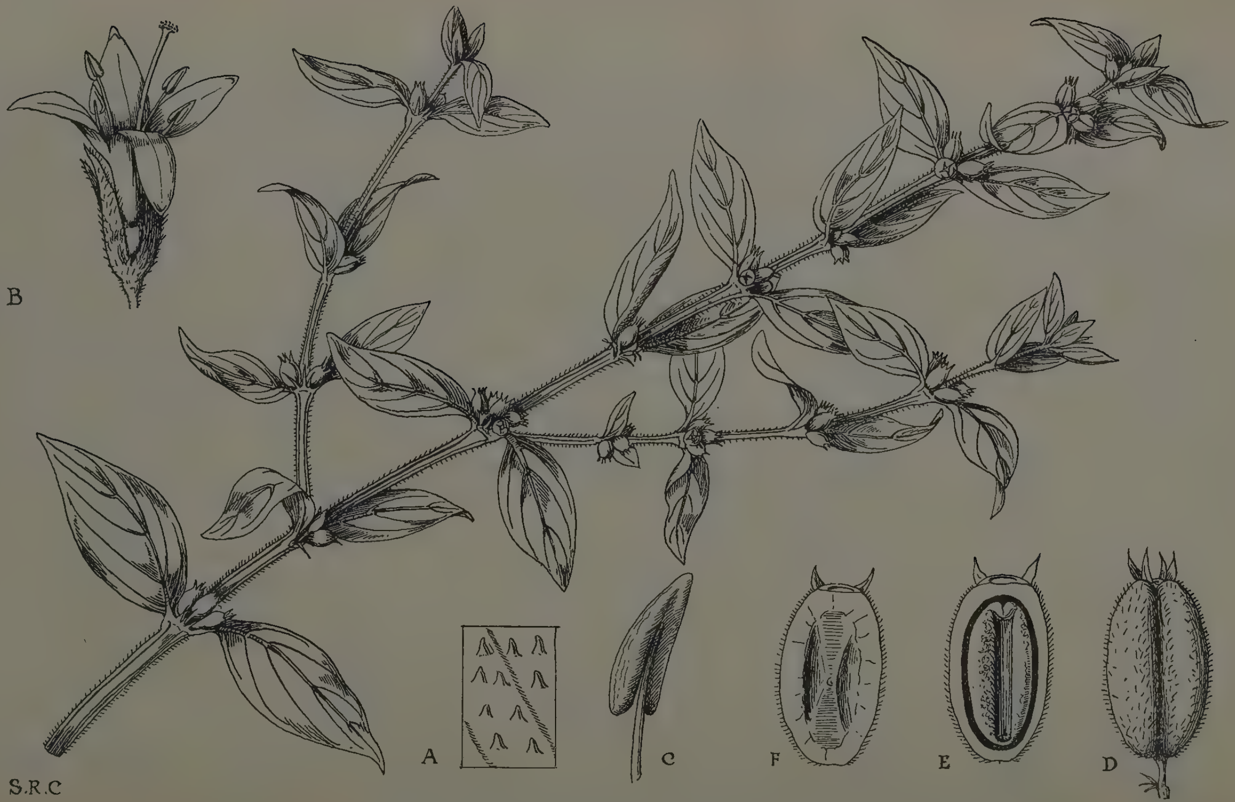

FIG. 215.—SPERMACOCE PILOSA *DC.* (RUBIACEAE).

A. surface of leaf. B, flower. C, anther. D, fruit. E, open half of the fruit. F, closed half of the fruit.

Stems long and softly pilose or scabrid ; stipular segments long and filiform
8. *Ruelliae*

Flowers in terminal globose heads with sometimes a smaller head at the next node, heads about 1 cm. diam. ; calyx-lobes subulate ; leaves oblanceolate, 3–5 cm. long, glabrous, with faint lateral nerves ; stems quite glabrous . . 9. *verticillata*

1. **Borreria ramisparsa** *DC.* Prodr. 4 : 544. *Spermacoce ramisparsa* Pohl—F.T.A. 3 : 238 ; Chev. Bot. 349. A weak nearly glabrous herb erect or decumbent, with very small white flowers in dense axillary and terminal clusters.
French Sudan : San. Senegal : Mbidjem ! Sierra Leone : common ! Gold Coast : Ashanti, Prah R. ! N. Nigeria : Lokoja, Patti (Sept.) ! S. Nigeria : Onitsha ! Exsicc.—*Heudelot* 558. *Franqueville*. *T. Vogel* 181. *Barter* 1765. *Sc. Elliot* 5252.

2. **B. radiata** *DC.* Prodr. 4 : 542. *Spermacoce radiata* Sieber—F.T.A. 3 : 237 ; Chev. Bot. 349. An erect hispid herb half-woody below, the stems often red-purple, with small white or lilac flowers in heads ½-1 in. in diameter.
French Sudan : Timbuktu ; Koulikoro ; Ségou. Senegal ! Gambia ! Togo : Basari ! N. Nigeria : Nupe ! Sokoto ! Katagum ! Bauchi Plateau, several localities ! Extends to E. Sudan. Exsicc.—*Sieber* 8. *Heudelot* 416. *Barter* 989. *Baikie*.

3. **B. compressa** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Spermacoce compressa* Afzelius—F.T.A. 3 : 235 ; Chev. Bot. 348. A glabrous erect herb, half-woody below, 1–2 ft. high, with white or lilac flowers ½–¾ in. long in dense axillary clusters.
French Guinea : Kouroussa (Sept.) ! Kouria. Sierra Leone : several localities ! N. Nigeria : Nupe ! Exsicc.—*Barter* 1231. *Sc. Elliot* 5264. *N. W. Thomas* 1294 ; 2368 ; 2465 ; 2731 ; 2887. *Deighton* 1229 ; 2151. *Pobéguin* 440.

4. **B. stricta** *G. F. W. Mey.* Prim. Fl. Esseq. 83. *Spermacoce stricta* Linn. f.—F.T.A. 3 : 236 ; Chev. Bot. 349. A glabrous narrow-leaved herb a few inches to 1 ft. or more high, with very small white flowers in axillary clusters.
French Sudan : Ouagadougou. Sierra Leone : Freetown, Hill Station (Oct.) ! Mabonto (Oct.) ! Bumbuna (Oct.) ! N. Prov., Kotahun (Oct.) ! In tropical Africa generally. Exsicc.—*N. W. Thomas* 3628 ; 3759. *Deighton* 2186. *Glanville* 14.

5. **B. hebecarpa** *Hochst.* ex *A. Rich.* Tent. Fl. Abyss. 1 : 347. *Spermacoce hebecarpa* Oliv.—F.T.A. 3 : 236. An erect slender-branched nearly glabrous herb with very small white or pinkish flowers in small round clusters.
Liberia : Duport ! N. Nigeria : Nupe ! Bauchi Plateau, Vom, 3,000–4,500 ft. ! Extends to E. Sudan, Abyssinia and Congo. Exsicc.—*Barter* 1259. *Dent Young* 127. *Linder* 1498.

6. **B. filiformis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Spermacoce filiformis* Hiern—F.T.A. 3 : 234. Erect herb usually sparingly branched and more or less hirsute, with very small white flowers in heads subtended by 4 leafy bracts ; habitat in rocky moist places.
N. Nigeria : Nupe ! Zungeru (Aug.) ! Bauchi Plateau, Naraguta (Aug.) ! Exsicc.—*Barter* 1720. *Dalz.* 212. *Lely* 503.

7. **B. stachydea** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Spermacoce stachydea* DC.—F.T.A. 3 : 235 ; Chev. Bot. 349. Erect branched herb with roughly pubescent subquadrangular stems woody below, 1–2 ft. high, and white or bluish flowers densely crowded in heads ½–1 in. in diameter.
French Sudan : Segou ! Ivory Coast : Baoulé-Nord, Nzi (Aug.) ! N. Nigeria : Nupe ! Katagum ! Sokoto (Dec.) ! Widely spread in tropical Africa. Exsicc. *Barter* 948. *Dalz.* 165. *Chev.* 2810 ; 22285.

8. **B. Ruelliae** *K. Schum.* in Notizbl. Bot. Gart. Berlin 5 : 104. *Spermacoce Ruelliae* DC.—F.T.A. 3 : 238 ; Chev. Bot. 349. *B. monticola* Mildbr., name only. A stout branched herb more or less hairy with white flowers ¼ in. long crowded in the axils often hidden by the leaves of axillary shoots.
A common weed in tropical Africa and in Madagascar. Exsicc.—*Heudelot* 278. *T. Vogel* 53 ; 72 ; 157. *Barter* 442. *Morson*. *Harrison*. *Rowland*. *Sc. Elliot* 4079 ; 4336 ; 4338 ; 4558. *Brown* 303. *Johnson* 524. *Elliott* 106. *Chev.* 24959. *Pobéguin* 342. *Warnecke* 47. *Mildbr.* 7071. (See Appendix).

9. **B. verticillata** *G. F. W. Mey.* Prim. Fl. Esseq. 83. *Spermacoce globosa* Schum. & Thonn.—F.T.A. 3 : 240 ; Stapf 614 ; Chev. Bot. 348. A glabrous branched more or less woody herb, with compact spherical heads of very small white flowers, common on cultivated land.
French Sudan : San. Senegal to Sierra Leone: common ! Liberia : Grand Bassa (July) ! Monrovia ! Kakatown ! Sino Basin ! Ivory Coast : Lower Cavally, Prolo. Togo : Lome ! N. Nigeria : Bauchi Plateau : Naraguta ! Tilde Fulani, 3,300 ft. (May) ! Vom, 3,000–4,500 ft. ! S. Nigeria : near Lagos ! In Cape Verde Islands, south to Angola ; also in Madagascar and in tropical America. Exsicc.—*Boivin*. *Döllinger*. *Sieber*. *Brunner*. *T. Vogel* 25 ; 37. *Rowland*. *Brown-Lester* 5 ; 6. *Whyte*. *Lely* 21 ; 72 ; 227. *Dent Young* 126. *Warnecke* 217. (See Appendix).

## 69. **SPERMACOCE** Dill.—F.T.A. 3 : 233, in small part.

Branchlets tomentose when young, becoming softly pubescent ; leaves ovate or ovate-elliptic, 3–4 cm. long, 1·5–2 cm. broad, scabrid on the upper surface, pubescent on the prominent ascending nerves below ; stipular sheath setose-pubescent outside, segments linear-filiform, about 5 mm. long ; flowers several at the nodes ; fruits shortly pubescent, about 3 mm. long, one cell indehiscent . . . . . . *pilosa*

**S. pilosa** *DC.*—F.T.A. 3 : 235. *Diodia pilosa* Schum. & Thonn. A more or less pubescent branched trailing herb with strongly-nerved leaves and very small white flowers clustered in the axils ; habit very like *Diodia scandens*.
Sierra Leone : Freetown ! Magbile (Dec.) ! Kumrabai (Dec.) ! Pujehun ! Gold Coast : Akwapim. Exsicc.—*T. Vogel* 107. *N. W. Thomas* 6300 ; 6891 ; 8421.

## 70. **OCTODON** Thonn.—F.T.A. 3 : 241.

Leaves filiform, 4–7 cm. long, subterete, glabrous, expanded into the broad cupular stipular sheath at the base ; stipular sheath shortly toothed, glabrous ; flowers crowded within the stipular sheath ; bracteoles filiform ; calyx-teeth 8, small ; corolla-lobes 4, acute ; anthers slightly exserted ; fruits pubescent towards the apex
1. *filifolium*

Leaves linear or linear-lanceolate, flat, 6–10 cm. long ; stipular sheath with several long setose lobes, scabrid outside ; bracteoles filiform, frimbriate at the apex ; calyx-teeth 4, obtuse ; corolla-lobes 4, as long as the tube ; anthers much exserted
2. *setosum*

1. **Octodon filifolium** *Schum. & Thonn.*—F.T.A. 3 : 241 ; Chev. Bot. 349. Erect slender glabrous herb, simple or branched, up to 1–2 ft. high, in grass, etc., with short slender tubular white flowers crowded at the upper nodes.

   French Sudan : San (Sept.) ! Senegal ! Gold Coast : Kpedsu (Dec.) ! N. Nigeria : Lokoja (Sept.) ! Tangale (Oct.) ! Abinsi (Aug.) ! Extends to E. Sudan and Nyasaland. Exsicc.—*Heudelot* 249. *T. Vogel* 118. *Dalz.* 640. *Lely* 660. *Talb.* 357.

2. **O. setosum** *Hiern*—F.T.A. 3 : 242 ; Chev. Bot. 349. Erect, usually branched, rather stout herb, woody below, with white or lilac small flowers crowded in terminal heads with several long bracts, and in a few upper axils ; habitat in damp places.

   French Sudan : Koumantou (Apr.) ! Toukoto. Senegal : Casamance. Ivory Coast : Toumodi ; Angouakoukro (Aug.) ! Gold Coast : Shai Plains (Jan.) ! Kpedsu (Dec.) ! Dahomey : Whydah to Adjounga (Apr.) ! ? locality ! N. Nigeria : Nupe ! Jebba ! Aguji ! Abinsi (July) ! Bauchi Plateau, between Hepham and Ropp, 4,000 ft. (July) ! Vom ! Keana (Oct.) ! S. Nigeria : Lagos ! Exsicc.—*Barter* 1258. *Burton. Johnson* 527. *Dawodu* 184 ; 269. *Talb.* 358. *Chev.* 23470. (See Appendix).

## 71. **MITRACARPUM** Zuccar.—F.T.A. 3 : 243.

A herb ; stems puberulous ; leaves lanceolate, subacute, 3–6 cm. long, 0·7–1·5 cm. broad, glabrous below, scabrous above or nearly smooth ; flowers densely crowded at the nodes within the pectinately divided stipular sheath ; calyx-lobes unequal, two oblong and two subulate smaller ones ; corolla-tube a little longer than the calyx ; bracteoles filiform .. .. .. .. .. .. .. *verticillatum*

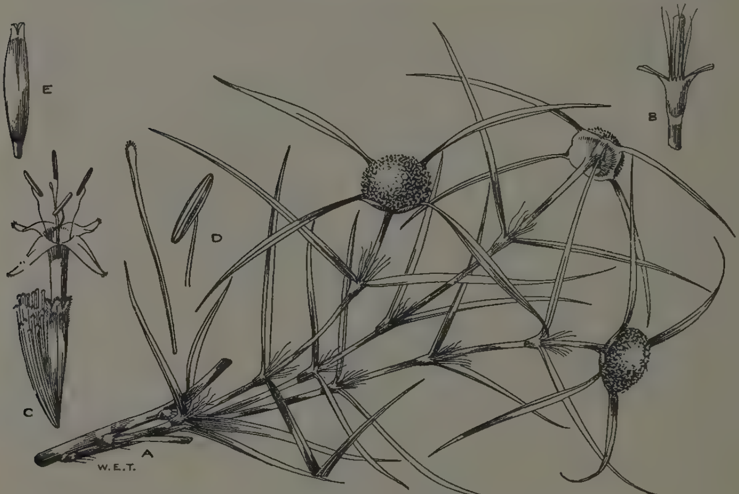

FIG. 216.—OCTODON SETOSUM *Hiern* (RUBIACEAE).

A, flowering shoot. B, stipules. C, flower and bracts. D, anther. E, fruit.

**M. verticillatum** *Vatke* in Linnaea 40 : 196. *M. scabrum* Zucc., name only—F.T.A. 3 : 243 ; Chev. Bot. : 350. *Staurospermum verticillatum* Schum. *M. senegalense* DC. *Oldenlandia verticillata* Bacle. An annual, woody at the base, erect, branched from a few inches to 2 ft., with dense axillary clusters of small white flowers.

Throughout the area ; extending to Mozambique ; also in Cape Verde Islands. Exsicc.—*Roger. Perrottet & Leprieur. Brown-Lester* 42. *T. Vogel* 52. *Barter* 1132. *Baikie. Moloney. Debeaux* 156. *Pobéguin* 300. (See Appendix).

## 72. **ANTHOSPERMUM** Linn.—F.T.A. 3 : 229.

Fruits densely and softly tomentose ; stems softly tomentellous, stout ; leaves narrowly oblanceolate, acute, about 8 mm. long, glabrous ; stipules sheathing, divided into several setiform segments, pubescent outside the sheath .. .. 1. *cameroonense*

Fruits glabrous ; stems scabrid-puberulous ; leaves oblanceolate, markedly apiculate, about 6 mm. long, slightly scabrid on the margin ; stipules divided into 2 segments from a broad sheathing base .. .. .. .. .. 2. *asperuloides*

1. **A. cameroonense** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *A. asperuloides* Hook. f. in Journ. Linn. Soc. 7 : 197, not of vol. 6 : 11—F.T.A. 3 : 230, partly. A small undershrub with rather stout woody stem irregularly branching, about 6 in. high.

   Cameroons Mt., 12,000 ft. (Jan.) ! Exsicc.—*Mann* 1290.

2. **A. asperuloides** *Hook. f.* in Journ. Linn. Soc. 6 : 11—F.T.A. 3 : 230, partly. Slightly woody with rather slender stems, 6 in. or more high.

   Fernando Po : on top of Clarence Peak, 9,348 ft. (Dec.) ! Exsicc.—*Mann.* 593.

### 73. GALIUM Linn.—F.T.A. 3 : 244.

Ovary and fruit without bristles ; fruit black when dry ; leaves (and stipules) about 8 in a whorl, linear-oblanceolate, acute, 2·5–4 cm. long, the margin clothed with recurved hooks ; flowers solitary, axillary ; pedicel elongating to 1·5 cm. long, recurved .. .. .. .. .. .. .. .. 1. *spurium*[1]

Ovary and fruit densely clothed with hooked bristles ; leaves (and stipules) 4 in a whorl, ovate-elliptic, apiculate, less than 1 cm. long, 4–8 mm. broad, setulose-pilose ; flowers cymose, cymes forming an oblong panicle ; pedicels 4–5 mm. long ; fruits very small 2. *Biafrae*

1. **G. spurium** *Linn.*[1] *G. Aparine* var. *spurium* Hiern—F.T.A. 3 : 245. *G. Deistelii* K. Krause. Herb, similar to the European Goose-grass or Cleavers but comparatively free from adhering bristles ; flowers white or yellow.
Cameroons Mt., 5,000–8,500 ft. (Jan., Dec.) ! Fernando Po, 6,000–8,000 ft. (Dec.) ! Also in East, South and North Africa, Europe and West Asia. Exsicc.—*Mann* 298 ; 612 ; 1324 ; 1980. *Dunlap* 29. *Mildbr.* 10927. *Deistel* 83.

2. **G. Biafrae** *Hiern*—F.T.A. 3 : 245. Herb, roughly setulose, with slender trailing branches from a tufted base, with small yellow flowers.
Cameroons Mt., 7,000–12,000 ft. (Jan., Nov.) ! Fernando Po, summit (Dec.) ! Exsicc.—*Mann* 605 ; 1284 ; 2001. *Johnston* 83. *Mildbr.* 10845.

## 124. DIPSACACEAE

Perennial or annual herbs. Leaves opposite or verticillate, entire or pinnately divided ; stipules absent. Flowers hermaphrodite, zygomorphic, often crowded into heads with an involucre of leafy bracts. Calyx epigynous, cupular or divided into pappus-like segments. Corolla gamopetalous, lobes imbricate. Stamens usually 4, rarely 2–3, alternate with the corolla-lobes and inserted usually towards the bottom of the tube ; anthers 2-celled, opening lengthwise. Ovary inferior, 1-celled ; style slender ; ovule solitary, pendulous from the top. Seeds with large straight embryo in scanty endosperm.

### SCABIOSA Tourn.—F.T.A. 3 : 251.

Involucral bracts leafy, about 2-seriate, free or connate at the base ; scales of the receptacle short ; corolla 4–5-fid ; herbs.

A perennial herb ; stems sparingly leafy, pubescent ; leaves lanceolate, subacute, gradually narrowed into the winged petiole, 10–12 cm. long, 2–4 cm. broad, entire, pilose above, glabrous or pilose only on the midrib below ; flowers in pedunculate heads ; bracts narrowly lanceolate, about 1 cm. long, densely setose-pilose ; bracts of the receptacle shorter than the flowers ; corolla pubescent outside ; calyx-lobes subulate .. .. .. .. .. .. .. .. .. *succisa*

**S. succisa** *Linn.*—F.T.A. 3 : 252. Erect sparingly branched herb from a perennial stock up to 3 ft. high.
Camerons Mt., upper grassland up to about 10,000 ft. (Nov., Jan., Feb.) ! Widely spread in temperate regions of the Old World. Exsicc.—*Mann* 1309. *Dalz.* 8326. *Deistel* 614. *Mildbr.* 10853. *Maitland* 833 ; 1005. *Migeod* 153 ; 165.

## 125. COMPOSITAE

Herbs, shrubs or rarely trees or climbers, sometimes with milky juice. Leaves alternate or rarely opposite, simple or variously divided ; stipules absent. Flowers small and crowded into heads (capitula) surrounded by an involucre of one or more series of free or variously connate bracts ; rarely heads compound and the partial heads containing few flowers or one flower. Receptacle concave, convex or globose, rarely elongated, with or without bracts below the flowers, sometimes honeycombed. Flowers hermaphrodite or unisexual, rarely dioecious, the outer ones (rays) mostly ligulate, the inner tubular (discoid), the latter mostly actino-morphic. Calyx usually much modified and thread-like (pappus), rarely dry and chaffy. Corolla gamopetalous, of the ray ligulate or filiform, of the disk 4–5-fid, rarely bilabiate. Stamens 5 or rarely 4, epipetalous, mostly included in the corolla-tube ; filaments free, anthers united (syngenesious), rarely free, 2-celled, opening lengthwise. Ovary inferior, 1-celled, 1-ovuled ; style of the hermaphrodite flowers various but serving as an important diagnostic feature, often clothed with collecting hairs which brush out the pollen. Ovule erect.

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[1] Our specimens are from the Cameroons Mt. and Fernando Po, and in all of them the flowers are solitary and not in small cymes as in true *G. spurium* L. from Europe and N. Africa ; the material is insufficient to determine whether the species is distinct.

Fruit (achene) sessile. Seeds without endosperm; embryo straight, with plano-convex cotyledons.

A highly advanced and easily recognised family widely spread nearly all over the world.

*Key to the Tribes.*

*Flowers not all ligulate; no milky juice (or very rare):
†Flowers of two kinds in each head, the outer female, ligulate or filiform, the inner tubular and hermaphrodite, or the flower-heads unisexual:
Flower-heads bisexual:
Receptacle with paleae subtending the flowers; leaves usually opposite; pappus mostly calyx-like or of stiff bristles
I. Helianthoideae
Receptacle without paleae; leaves alternate or rarely opposite:
Style-arms of the hermaphrodite flowers truncate and usually penicillate at the apex (see fig. 220); anthers not tailed at the base:
Pappus present, setose; involucral bracts in one main series, sometimes with smaller ones at the base
II. Senecionideae
Pappus absent; involucral bracts in two main series
III. Anthemideae
Style-arms not truncate; involucral bracts usually in several rows:
Style-arms of the hermaphrodite flowers with a lanceolate or deltoid papillous tip (see fig. 221); anther-base not tailed:
Involucral bracts in several series
IV. Asteroideae
Involucral bracts in one main series with an outer series of smaller ones
II. Senecionideae
Style-arms of the hermaphrodite flowers club-shaped or obtuse, smooth (see fig. 223):
Anther-base tailed; styles of both types of flower divided
V. Inuloideae
Anther-base sagittate or mucronate; style of the sterile flowers undivided
XI. Arctotideae
Flower-heads unisexual; leaves deeply pinnately divided; male flower-heads in a terminal raceme, females axillary, clustered
VI. Ambrosieae
††Flowers all of one kind, all tubular and hermaphrodite:
Style-arms without a ring of hairs below the base:
Style-arms very slender and tapering, minutely hairy all over (see fig. 226); flowers never yellow; leaves alternate or very rarely opposite:
Involucral bracts in several series, sometimes foliaceous
VII. Vernonieae
Involucral bracts in a single series
II. Senecionideae
Style-arms truncate, obtuse or clavate at the apex (fig. 223), usually glabrous:
Leaves alternate:
Anther-base rounded, not tailed:
Style-arms slender
VIII. Eupatorieae
Style-arms fairly thick, truncate
II. Senecionideae
Anther-base sagittate, usually tailed at the base:
Style-arms club-shaped, without an apical appendage
V. Inuloideae
Style-arms terminating in a short glandular appendage
IX. Mutisieae
Leaves opposite, entire; flowers yellow
X. Helenioideae
Style-arms with a ring of hairs below the base, short, narrow, rather obtuse; involucral bracts in several series, usually terminating in a spine and often pectinately toothed; flowers mostly mauve or blue
XII. Cynaroideae
**Flowers all ligulate and hermaphrodite, usually yellow; juice milky
XIII. Cichorieae

### Tribe I.—Helianthoideae

Paleae of the receptacle flat or nearly so, not folded around the achenes:
Involucral bracts free, outer herbaceous, inner merging into the paleae of the receptacle:
Outer achenes flat, winged, wings pectinate, inner angular, crowned with 2–3 bristles
1. **Synedrella**

Outer achenes not winged, all with a paleaceous pappus; low weedy herbs 2. **Galinsoga**
Outer achenes subtetragonal, without a pappus; corolla-tube densely pubescent especially at the base; outer bracts foliaceous; tall herbs .. .. 3. **Guizotia**
Inner involucral bracts connate at the base, outer fewer and smaller:
Achenes with 2–4 bristles at the apex:
Bristles with ascending barbs or smooth .. .. .. .. 4. **Coreopsis**
Bristles with reflexed barbs .. .. .. .. .. .. 5. **Bidens**
Achenes without a pappus:
Style-branches tapered into long puberulous appendages; a low weedy herb with small flower-heads .. .. .. .. .. .. 6. **Chrysanthellum**
Style-branches truncate; erect slender branched herb .. .. 7. **Microlecane**
Paleae of the receptacle concave or folded around the achenes:
Inner involucral bracts not embracing the achenes:
Leaves alternate, ovate; flower-heads terminal; involucral bracts leafy; achenes smooth, without a pappus .. .. .. .. .. .. 8. **Sclerocarpus**
Leaves opposite:
Pappus forming a small cup or annulus with or without short bristles:
Ray-flowers fertile:
Ligulate flowers very small; pappus bristles 2 or 3, persistent 9. **Blainvillea**
Ligule conspicuous; pappus bristles soon falling off .. .. 10. **Wedelia**
Ray-flowers not fertile; ligule conspicuous .. .. .. .. 11. **Aspilia**
Pappus composed of separate bristles or reduced to teeth, not united into a cup or annulus:
Achenes thick or angular, not compressed:
Scales of the receptacle numerous and conspicuous, broad; flower-heads fairly large .. .. .. .. .. .. .. .. 12. **Melanthera**
Scales of the receptacle few and narrow; flower-heads small.. 13. **Eclipta**
Achenes of the disk-flowers compressed:
Achenes winged .. .. .. .. .. .. .. 14. **Verbesina**
Achenes not winged .. .. .. .. .. .. 15. **Spilanthes**
Inner involucral bracts embracing the fertile ray-achenes:
Ray-flowers in several rows; flower-heads axillary, sessile; achenes without a pappus, not spinose.. .. .. .. .. .. .. 16. **Enhydra**
Ray-flowers in one row; flower-heads axillary, sessile; achenes armed with hooked prickles .. .. .. .. .. .. .. .. 17. **Acanthospermum**

### Tribe II.—SENECIONIDEAE

Style-branches ending in long subulate, ovate or lanceolate appendages; heads discoid:
Style-branches long-subulate; stems leafy .. .. .. .. .. 18. **Gynura**
Style-branches ovate or lanceolate; stems not leafy .. .. .. 19. **Notonia**
Style-branches more or less truncate:
Involucre not calyculate; heads discoid .. .. .. .. .. 20. **Emilia**
Involucre calyculate; heads radiate or discoid .. .. .. .. 21. **Senecio**

### Tribe III.—ANTHEMIDEAE

Heads solitary; corolla of hermaphrodite flowers 4-toothed; dwarf weedy annual 22. **Cotula**
Heads solitary; corolla of hermaphrodite flowers 5-toothed .. 23. **Matricaria**
Heads not solitary, usually racemose-paniculate; corolla of hermaphrodite flowers 5-toothed .. .. .. .. .. .. .. .. 24. **Artemisia**

### Tribe IV.—ASTEROIDEAE

Pappus well developed, setaceous:
Ligulate flowers present though sometimes very small:
Shrubs or climbers; ligules white .. .. .. .. .. 25. **Microglossa**
Herbs .. .. .. .. .. .. .. .. .. 26. **Erigeron**
Ligulate flowers absent; herbs:
Style of the hermaphrodite flowers 2-lobed.. .. .. .. .. 27. **Conyza**
Style of the hermaphrodite flowers entire or emarginate .. .. 28. **Adelostigma**
Pappus absent or very rudimentary or of a few early caducous bristles:
Pappus of few short minutely hooked caducous setae .. .. 29. **Microtrichia**
Pappus of minute subspathaceous teeth; capitula yellow.. .. 30. **Grangea**
Pappus an annulus or absent:
Capitula yellow .. .. .. .. .. .. .. 31. **Ceruana**
Capitula white, violet or purple .. .. .. .. .. 32. **Dicrocephala**

### Tribe V.—INULOIDEAE

Flower-heads separate, not crowded into compound heads:
Receptacle with paleae subtending the flowers .. .. .. 33. **Anisopappus**

Receptacle without paleae
Female flowers ligulate :
Outer pappus present, very short, paleaceous, connate at the base into a cup .. 34. **Pulicaria**
Outer pappus setaceous .. .. .. .. .. .. .. 35. **Inula**
Outer pappus absent .. .. .. .. .. .. .. .. 36. **Vicoa**
Female flowers filiform or tubular :
Style-branches of the hermaphrodite flowers filiform or rounded at the apex, not truncate :
Shrubs or undershrubs .. .. .. .. .. .. 37. **Pluchea**
Herbs ; anther-base tailed :
Outer flowers filiform :
Pappus of numerous bristles .. .. .. .. .. 38. **Blumea**
Pappus of few bristles .. .. .. .. .. 39. **Porphyrostemma**
Outer flowers tubular .. .. .. .. .. .. 40. **Pegolettia**
Herbs ; anther-base not tailed .. .. .. .. .. 41. **Laggera**
Style-branches of the hermaphrodite flowers truncate :
Flowers very few (up to 10) in each head, narrow .. .. 42. **Achyrocline**
Flowers numerous in each head :
Female flowers less numerous than the hermaphrodite flowers 43. **Helichrysum**
Female flowers more numerous than the hermaphrodite flowers 44. **Gnaphalium**
Flower-heads crowded into compound heads .. .. .. 45. **Sphaeranthus**

### Tribe VI.—Ambrosieae

Small shrubs with strongly aromatic leaves and racemes of small depressed flower-heads .. .. .. .. .. .. .. .. .. 46. **Ambrosia**

### Tribe VII.—Vernonieae

Pappus present :
Pappus persistent for some time, not coroniform :
Pappus-setae numerous in many series ; heads large, girt by the elongated upper leaves .. .. .. .. .. .. .. .. .. .. 47. **Aedesia**
Pappus-setae numerous in 2–few series ; heads not or rarely girt by the upper leaves 48. **Vernonia**
Pappus-setae 5 or 6, in 1 or 2 series ; leaves gland-dotted .. 49. **Elephantopus**
Pappus early caducous or of short scales with a few caducous bristles between or coroniform :
Pappus coroniform, pectinately toothed ; involucral bracts 3-seriate, free 50. **Triplotaxis**
Pappus uniform, setose, setae subplumose towards the base .. 51. **Erlangea**
Pappus setae in two rows, the outer scale-like, the inner 3–5 longer and barbellate 52. **Herderia**
Pappus absent :
Flower-heads sessile and clustered in the leaf-axils .. .. 53. **Sparganophorus**
Flower-heads more or less corymbose :
Achenes broadly truncate at the apex .. .. .. .. 54. **Ethulia**
Achenes rounded at the apex .. .. .. .. .. 55. **Gutenbergia**

### Tribe VIII.—Eupatorieae

Setae of the pappus numerous ; anther with a produced connective at the apex :
Erect herbs ; leaves mostly alternate .. .. .. .. 56. **Eupatorium**
Climbers ; leaves opposite .. .. .. .. .. .. 57. **Mikania**
Setae of the pappus 4–5 ; leaves opposite (or the upper alternate) :
Apex of the anther truncate or minutely apiculate ; pappus-setae gland-tipped 58. **Adenostemma**
Apex of the anther with an ovate produced connective ; pappus-setae not gland-tipped .. .. .. .. .. .. .. .. .. 59. **Ageratum**

### Tribe IX.—Mutisieae

Caulescent, branched herbs or shrubs :
Involucral bracts not pungent-pointed .. .. .. .. 60. **Pleiotaxis**
Involucral bracts rigid, pungent-pointed .. .. .. .. .. 61. **Dicoma**
Acaulescent ,scapigerous herbs .. .. .. .. .. .. 62. **Gerbera**

### Tribe X.—Helenioideae

Stems several from a woody rhizome ; leaves opposite, sessile, entire ; flowers all tubular ; pappus tawny, subplumose .. .. .. 63. **Hyperiocphyllum**

### Tribe XI.—Arctotideae

Herbs with densely prickly leaves; leaves alternate; involucral bracts spinescent; achenes villous; pappus paleaceous .. .. .. .. 64. **Berkheya**

### Tribe XII.—Cynaroideae

Flower-heads separate, many-flowered:
Involucral bracts more or less pectinate; achenes glabrous .. 65. **Centaurea**
Involucral bracts not pectinate; achenes villous; pappus plumose 66. **Atractylis**
Flower-heads crowded into a globose head; partial flower-heads 1-flowered 67. **Echinops**

### Tribe XIII.—Cichorieae

Setae of the pappus plumose .. .. .. .. .. .. .. 68. **Picris**
Setae of the pappus smooth or barbellate:
Achenes with long slender beaks:
Achenes compressed .. .. .. .. .. .. .. 69. **Lactuca**
Achenes not compressed .. .. .. .. .. .. .. 70. **Crepis**
Achenes not beaked:
Achenes 10-or more-ribbed .. .. .. .. .. .. 71. **Sonchus**
Achenes 4–5-ribbed, short, narrowly winged .. .. .. 72. **Launaea**

### 1. **SYNEDRELLA** Gaertn.—Benth. & Hook. f. Gen. Plant. 2: 383.

Stems appressed-pubescent; leaves opposite, ovate, cuneate at the base, up to 8 cm. long and 5 cm. broad, finely crenate, shortly appressed-setulose on both surfaces; petiole winged, bristly-ciliate; flower-heads crowded and subsessile in the leaf-axils; involucral bracts broadly oblong-lanceolate, finely nervose, 8–10 mm. long; outer achenes flat, winged, wings pectinate, inner 2–3-sided, scabrid, crowned with 2 or 3 bristles .. .. .. .. .. .. .. .. .. .. *nodiflora*

**S. nodiflora** *Gaertn.*—F.T.A. 3: 386, in obs.; Chev. Bot. 372. *Blainvillea Gayana* A. Chev. Bot. 369, not of Cass. An erect branched herb, half-woody below, 2–4 or more feet high, with yellowish narrow oblong flower-heads.

A common tropical weed. Exsicc.—*Sc. Elliot* 3888. *Rowland. Johnson* 627. *Farmar* 323. *Chev.* 12142; 14848; 18639. (See Appendix).

### 2. **GALINSOGA** Ruiz & Pav.—Benth. & Hook. f. Gen. Pl. 2: 390.

A low herb; stems thinly pubescent; leaves opposite, thin, ovate-rhomboid, acutely acuminate, serrate-dentate, broadly cuneate at the base, about 4 cm. long and 3 cm. broad, nearly glabrous; petiole slender; peduncles about 1 cm. long, glandular-pubescent; involucral bracts elliptic, green, glabrous; achenes pubescent, pappus paleaceous .. .. .. .. .. .. .. .. *parviflora*

**G. parviflora** *Cav.* Ic. 3: 41, t. 281.
Naturalised in the Buea district of Cameroons Mt. and other parts of Africa; native of America.

### 3. **GUIZOTIA** Cass.—F.T.A. 3: 385.

Stems thinly setose-pilose; leaves opposite, sessile, lanceolate, subacute, up to 18 cm. long and 5 cm. broad, dentate, thinly setose-pilose on both surfaces; flower-heads surrounded by an outer leafy involucre; leafy bracts lanceolate, about 2 cm. long; involucral bracts 2–3-seriate, oblanceolate, with a triangular apex, about 8 mm. long, appressed-pilose; receptacular paleae oblong-lanceolate, convex outside, ciliate in the upper part; ray-flowers with a broad several-nerved limb; corolla-tube densely pubescent especially at the base; achenes glabrous *Schultzii*

**G. Schultzii** *Hochst.*—F.T.A. 3: 385. An erect harshly pubescent soft-wooded herb, 2–3 ft. or up to 6 ft. high, with bright yellow flower-heads 1 in. or more across.

N. Nigeria: Kontagora, common in fields (Nov.)! Bauchi Plateau: Panyam, 4,500 ft. (July)! Naraguta and Jos (Jan., Sept.)! Extends to E. Sudan, Abyssinia, and E. Africa south to Nyasaland. Exsicc.—*Dalz.* 194. *Lely* P. 113; 413; 589.

### 4. **COREOPSIS** Linn.—F.T.A. 3: 387.

Achenes not winged:
Achenes scabrid on the surface; bristles smooth; stems glabrous; leaves sessile, deeply tripartite, up to about 12 cm. long, segments coarsely toothed, shortly setulose on the margin; flower-heads large (seen only in fruit); receptacular scales oblanceolate, glabrous .. .. .. .. .. .. 1. *asperata*
Achenes smooth; bristles barbellate; stems glabrous or pubescent; leaves petiolate, deeply 3–5-partite, 4–5 cm. long, segments coarsely lobulate-toothed, glabrous or pubescent; flower-heads pedunculate, 3·5–4 cm. diam. (incl. the rays) 2. *monticola*
Achenes winged; bristles of achenes barbellate:
Achenes nearly as broad as long, subquadrangular in outline, with a thick stramineous wing; leaves deeply 3-partite and coarsely toothed, glabrous; flower-heads about

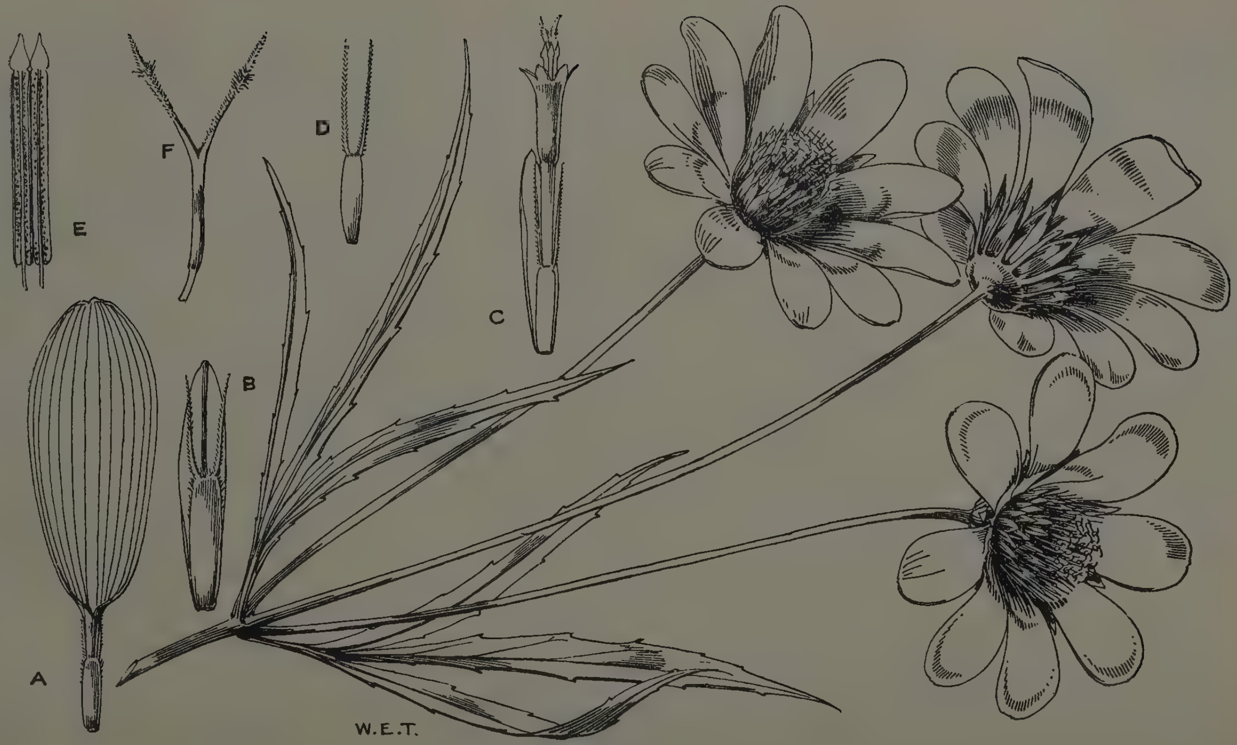

FIG. 217.—COREOPSIS GUINEENSIS *Oliv. & Hiern* (COMPOSITAE).
A, ray-flower. B, achene and subtending palea. C, disk-flower and palea. D, achene. E, anthers. F, style-arms.

5 cm. diam. (incl. rays); outer bracts as long as the inner, linear, glabrous, inner broadly oblong-lanceolate, glabrous .. .. .. .. .. 3. *Barteri*

Achenes much longer than broad, oblanceolate, with a thin membranous wing; leaves deeply tripartite into linear or linear-lanceolate dentate segments up to 15 cm. long and 1·5 cm. broad, minutely scabrid on the margin; outer bracts as above but much shorter than the inner .. .. .. .. .. .. 4. *guineensis*

1. **Coreopsis asperata** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. A strong-growing herb with thick ribbed stems and rather large flower-heads.
French Guinea: Faranna, Sambadougou (Jan.)! Upper Sassandra, Toura country, Gouekouma, 2,700 ft. (May)! Mt. Bourou, 3,400 ft. (May)! Sierra Leone: Sorémoudou (Jan.)! Exsicc.—*Chev.* 20543; 20554; 20568; 21675; 21717.

2. **C. monticola** *Oliv. & Hiern*—F.T.A. 3: 370. Stems and leaves glabrous; an erect sparingly-branched herb 1–3 ft. high, half-woody, with yellow flower-heads $1\frac{1}{2}$ in. across.
Cameroons Mt.: grasslands, 5,000–8,000 ft. or over (Dec., Jan.)! Exsicc.—*Mann* 1219; 1922. *Johnston* 26. Kalbreyer 125. *Mildbraed* 10930.

var. **pilosa** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. Stems, leaves and outer involucral bracts pilose; up to 10 ft. high.
Cameroons Mt.: in a ravine above the timber line, 7,000 ft. (Jan.)! Exsicc.—*Dunlap* 204.

3. **C. Barteri** *Oliv. & Hiern*—F.T.A. 3: 390. Erect glabrous branched annual, woody below, 1–3 ft. high, with yellow flower-heads 1–2 in. across.
N. Nigeria: Borgu! Bauchi Plateau, Jos, common (Mar., Sept.)! Vom, 3,000–4,500 ft.! S. Nigeria: Lagos Colony! Exsicc.—*Barter*. *Rowland*. *Phillips* 49. *Hill* 12. *Lely* 43. *Dent Young* 152. *Talb.* (no number).

4. **C. guineensis** *Oliv. & Hiern*—F.T.A. 3: 390; Chev. Bot. 372, partly. *C. camporum* Hutch. *C. togoensis* Sherff? A nearly glabrous erect branched annual, 2 ft. up to 7 or 8 ft. high, with conspicuous yellow flower-heads over 2 in. across.
French Sudan: Koulikoro (Oct.)! San; Macina. French Guinea. N. Nigeria: common in grass savannah in damp localities! S. Nigeria: Lagos Colony, several localities! Abeokuta (Nov.)! Extends to E. Sudan. Exsicc.—*Barter* 933. *Baikie*. *Irving*. *Rowland*. *MacGregor* 283. *Dalz.* 192; 652. *Parsons* 64. *Foster* 136. *Lely* 383; 616. *Chev.* 2083; 2084; 22228 23493; 24949.

*Imperfectly known species.*

**C. tadia** *Sherff* in Bot. Gaz. 76: 90.
Togo: on gneiss mountains. Exsicc.—*Gironcourt* 256.

### 5. BIDENS Linn.—F.T.A. 3: 392.

Glabrous or nearly so; leaves once pinnate, leaflets usually 3 but sometimes 5, more or less ovate, acutely acuminate, cuneate at the base, very sharply serrate, 4–5 cm. long, glabrous or slightly setulose on the upper surface; involucral bracts 2-seriate, the outer not ciliate, the inner about 1 cm. long, with hyaline margins; achenes ribbed, very slightly setulose; bristles barbate .. .. .. .. .. 1. *pilosa*

Setulose-pubescent or pilose; leaves twice pinnate, leaflets narrowly ovate, acute, coarsely toothed, about 3 cm. long; involucral bracts as above, but the outer ciliate or pubescent; achenes as in *B. pilosa* .. .. .. .. 2. *bipinnata*

1. **B. pilosa** *Linn.*—F.T.A. 3: 392; Holl. 3: 389; Chev. Bot. 373. Erect annual 2–3 ft. or more high, with flower-heads $\frac{1}{4}$–$\frac{1}{2}$ in. in diameter lengthening and widening in fruit, the ray-florets usually white, sometimes yellow, achenes black.
A common tropical weed! (See Appendix).

2. **B. bipinnata** *Linn.*—F.T.A. 3: 393; Chev. Bot. 373. Habit of the last, with pale yellow flowers.
A common tropical weed!

### 6. CHRYSANTHELLUM Rich.—F.T.A. 3: 394.

Stems numerous from the base, spreading, glabrous; leaves alternate, multisect, up to about 4 cm. long including the petiole, glabrous, segments oblong-lanceolate, subacute; flower-heads small, numerous, pedunculate; involucral bracts 1–2-seriate, about 4 mm. long, glabrous, with thin margins; rays very small; achenes compressed, oblong, with a thick straw-coloured slightly hairy margin .. *procumbens*

**C. procumbens** *Pers.*—F.T.A. 3: 395 Chev. Bot. 373. A glabrous branching annual, procumbent often with a rosette of deeply divided leaves, or suberect, with golden-yellow flower-heads $\frac{1}{3}$ in. in diameter.
A common tropical weed. Exsicc.—*T. Vogel* 192. *Barter* 1298. *Baikie*. *Burton*. *Dawodu* 92. *Imp. Inst.* 51907. *Schlechter* 12349. (See Appendix).

### 7. MICROLECANE Sch. Bip.—F.T.A. 3: 386.

A herb; stems ribbed, glabrous; leaves up to about 6 cm. long, ovate in outline, deeply bipinnately lobed, lobules oblong, mucronate, glabrous; petiole up to 3 cm. long, slender; flower-heads corymbose, small, 1·5–2 cm. diam., on slender peduncles; involucral bracts broadly elliptic, glabrous; achenes flat, without a pappus *occidentalis*

**M. occidentalis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. A herb 1–2 ft. high, with small yellow flower-heads.
French Guinea: Futa-Jallon, between Irébéléya and Timbo 1,800–2,150 ft. (Sept.)! Farana, Sambadougou and Boria (Jan.)! Niger sources at Sorémoudou (Jan.)! Ivory Coast: Toura country, Gouékouma, 2,700 ft.! Mt. Bourou, 3,400 ft. (May)! Exsicc.—*Chev.* 18296; 20543; 20554; 20568; 21675; 21717.

### 8. SCLEROCARPUS Jacq.—F.T.A. 3: 373.

Branchlets slightly strigillose, ribbed; leaves alternate, ovate, acute, abruptly narrowed at the base, 7–12 cm. long, 3·5–6 cm. broad, crenate-serrate except at the base, scabrid-setulose above, pilose below; petiole slender; flower-heads terminal, with subtending smaller leaves; bracts few, leafy; receptacle with large boat-shaped ribbed paleae enveloping the fertile flowers; ray-flowers about 3, small; achenes smooth, without a pappus .. .. .. .. .. .. *africanus*

**S. africanus** *Jacq.*—F.T.A. 3 : 374; Stapf 615; Chev. Bot. 369. Erect branched annual 1–4 ft. high, more or less roughly pubescent, with the leaves mostly alternate and yellow flower-heads $\frac{1}{2}$–$\frac{2}{3}$ in. in diameter with leafy bracts.

A weed of waste places in tropical Africa generally and introduced into the Eastern Tropics. Exsicc.—*Ansell.* *Barter* 1294. *Rowland.* *Millen* 92. *Dalz.* 657.

## 9. BLAINVILLEA Cass.—F.T.A. 3 : 374.

Leaves opposite, broadly ovate, acuminate, very shortly cuneate at the base, 6–10 cm. long, 3–6 cm. broad, thin, shortly pilose on the nerves and veins, trinerved at the base, crenate-serrate; petiole slender, pilose; flower-heads pedunculate at the ends of the shoots; peduncle up to 4 cm. long; outer involucral bracts broadly lanceolate, acute, thin, about 1 cm. long; achenes all more or less alike, sharply 3-angled, minutely transversely wrinkled, crowned with 3 barbellate bristles about $\frac{1}{2}$ as long as the achene .. .. .. .. .. .. .. .. 1. *Gayana*

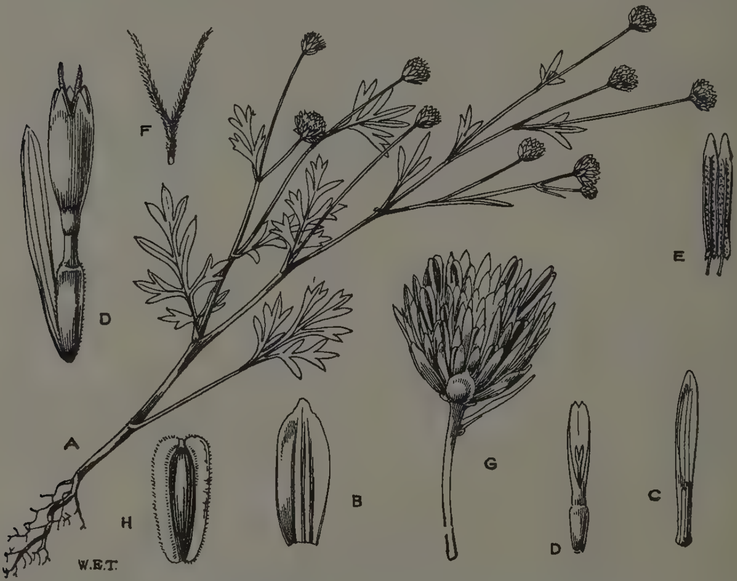

Fig. 218.—Chrysanthellum procumbens *Pers.* (Compositae).

A, whole plant. B, involucral bract. C, bract. D, disk-flower and palea. E, anthers. F, style-arms. G, fruiting head. H, achene.

Leaves lanceolate, acute, very shortly petiolate, 5–15 cm. long, up to 2·5 cm. broad, scabrid-setulose on both surfaces, distinctly serrulate; flower-heads on slender peduncles, 1 cm. diam.; involucral bracts about 4-seriate, outer greenish, scabrid-setose, the inner densely fringed with hairs; achenes slightly compressed, densely pilose, crowned with 2 very short bristles .. .. .. .. 2. *Prieuriana*

1. **B. Gayana** *Cass.*—F.T.A. 3 : 375; Chev. Bot. 369, partly. Erect branched more or less hairy annual 1–3 ft. high, with few oblong white flower-heads $\frac{1}{2}$ in. long.

French Sudan: Macina (Sept.)! Senegal: Mbidgem, etc.! N. Nigeria: Katagum! Also in Cape Verde Islands, extending to Abyssinia and Arabia. Exsicc.—*Perrottet.* *Heudelot* 248. *Dalz.* 168. *Chev.* 24864.

2. **B. Prieuriana** *DC.*—F.T.A. 3 : 375. *Aspilia angustifolia* A. Chev. Bot. 370, partly, not of Oliv. & Hiern. Erect branched roughly pubescent or scabrid annual 1–2 ft. high, with hemispherical or shortly oblong flower-heads $\frac{1}{3}$ in. in diameter, red-purple at least when dry.

Senegal. Gambia: Albreda, etc.! Sierra Leone: Scarcies R., Kora (Feb.)! Yungeru (Jan.)! Dahomey: between Agouagon and Save (May)! S. Nigeria: Oloke Meji (July)! Also in E. Sudan. Exsicc.—*Perrottet.* *Sc. Elliot* 4593. *Foster* 317. *N. W. Thomas* 7279. *Hayes* 573; 580. *Chev.* 23557.

### 10. **WEDELIA** Jacq.—F.T.A. 3 : 376.

Stems straggly or suberect ; leaves opposite, lanceolate, acute, rounded at the base, 3–6 cm. long, 1–2 cm. broad, setose-scabrid on both surfaces, with ascending nerves, obscurely serrulate ; petiole very short, pilose ; flower-heads solitary, terminal on a slender peduncle about 3 cm. long ; involucral bracts oblong-lanceolate, about 1 cm. long, densely setose-pilose outside ; ray-flowers conspicuous, neuter ; achenes of disk-flowers shortly pubescent ; pappus minute, jagged .. .. 1. *africana*

Stems procumbent ; leaves opposite, trilobed, broadly cuneate in the lower half, lobes broadly triangular, dentate, about 4 cm. long and 3 cm. broad, sparingly setulose on the nerves ; petiole up to 5 mm. long, sparingly setose ; flower-heads axillary, long-pedunculate ; involucral bracts leafy, sparingly setulose.. .. 2. *trilobata*

1. **W. africana** *Beauv.* Fl. Owar. 2 : 19, t. 69—F.T.A. 3 : 376. Half-woody herb from a hard rootstock, straggling, rather harshly pubescent, with yellow flower-heads ¾–1 in. in diameter ; turning olive-blackish in drying.
   Sierra Leone : Kortright Hill (Mar.) ! Leicester Peak (Dec.) ! Gold Coast : Dukwesein (Dec.) ! N. Nigeria : Bauchi Plateau, Naraguta ! Liruwen-Kano Hills ! S. Nigeria : Warri. Also in E. Africa. Exsicc.—*Winwood Reade. H. H. Johnston* 5. *Sc. Elliot* 3893. *Chipp* 622. *Lely* 60. *Carpenter.*
2. **W. trilobata** *Hitchc.* in Rep. Missouri Bot. Gard. 4 : 99. *Silphium trilobatum* Linn. *W. carnosa* Pers. Prostrate, rooting at the nodes, with yellow flowers ¾ in. in diameter ; probably introduced from tropical America.
   Sierra Leone : Freetown, common in moist places (May) ! Makump (Aug.) ! Exsicc.—*Deighton* 1186; 1380.

### 11. **ASPILIA** Thouars—F.T.A. 3 : 378.

Leaves ovate or lanceolate :
 Ray-flowers yellow :
  Heads not involucrate by the uppermost leaves :
   Outer involucral bracts green in the upper ⅔, lanceolate, nearly as long as the ray-flowers ; peduncles rather long and slender ; leaves ovate, acute, minutely crenulate, petiolate, up to about 10 cm. long and 5 cm. broad, shortly pubescent-scabrid .. .. .. .. .. .. .. .. 1. *latifolia*
   Outer involucral bracts much shorter than the ray-flowers ; flower-heads subsessile or shortly pedunculate ; leaves ovate, crenate, up to 6 cm. long and 3 cm. broad, pilose mainly on the nerves.. .. .. .. .. .. 2. *Smithiana*
   Outer involucral bracts and flower-heads as above ; leaves sessile, lanceolate, acute, 6–9 cm. long, about 1·5–2 cm. broad, scabrid above, slightly setulose only on the nerves below ; outer involucral bracts broadly linear, 1 cm. long ; achenes glabrous 3. *Chevalieri*
  Heads involucrate by the uppermost leaves, clustered ; involucral bracts densely pectinate-ciliate ; leaves narrowly ovate-lanceolate, acuminate, 7–10 cm. long, 2–3 cm. broad, 3-nerved from above the base, setose above, pilose below ; setae of the pappus obsolete .. .. .. .. .. .. .. .. 4. *rudis*
 Ray-flowers white, red or purple :
  Flower-heads solitary on slender peduncles ; leaves petiolate, ovate or ovate-lanceolate, gradually acute, 6–10 cm. long, 2·5–4 cm. broad, setose-pilose, 3-nerved from near the base ; outer involucral bracts green in the upper ⅔, broadly linear ; achenes silky .. .. .. .. .. .. .. .. .. 5. *helianthoides*
  Flower-heads more or less clustered and sessile ; leaves sessile, linear-lanceolate, gradually pointed, 5–10 cm. long, up to 2·5 cm. broad, pilose on both sides with stiff hairs .. .. .. .. .. .. .. .. 6. *Kotschyi*
Leaves linear, scabrid-setose on the upper surface :
 Internodes shortly pilose ; outer involucral bracts rounded at the apex, about 1 cm. long .. .. .. .. .. .. .. .. .. 7. *angustifolia*
 Internodes long-pilose-villous ; outer-involucral bracts pointed, long-setose, villous towards the base outside .. .. .. .. .. .. 8. *linearifolia*

1. **Aspilia latifolia** *Oliv. & Hiern*—F.T.A. 3 : 379 ; Holl. 3 : 385. *A. guineensis* O. Hoffm. & Muschler ; Chev. Bot. 370. Scrambling, usually hispid herb, with bright yellow flower-heads 1 in. across.
   Common from French Guinea to N. and S. Nigeria and Cameroons ! Extends to E. Sudan and Upper Welle. Exsicc.—*T. Vogel* 26. *Baikie. Mann* 2325. *Moloney. Rowland. Millson. Millen*, 4. *Chipp* 537. *Dalz.* 31 ; 658 ; 1170. *Migeod* 317 ; 430. *Johnston* 44. *Kalbreyer* 210. *Warnecke* 256. *Chev.* 14622 ; 14650 ; 18244. (See Appendix).
2. **A. Smithiana** *Oliv. & Hiern*—F.T.A. 3 : 380. Scabrid herb 1–2 ft. high.
   Dahomey ! Also in Congo Basin. Exsicc.—*Burton.*
3. **A. Chevalieri** *O. Hoffm. & Muschler* in Bull. Soc. Bot. Fr., Mém. 8c :115 ; Chev. Bot. 370. Erect, shortly scabrid-pubescent, 1–2 ft. high, with yellow flower-heads ¾ in. across.
   French Sudan : Bamako (Jan.) ! Nyamina to Koulikoro (Oct.) ! French Guinea : Farana (Mar.) ! Sierra Leone : Scarcies, Buyabuya (Feb.) ! Exsicc.—*Chev.* 202 bis ; 2027. *Sc. Elliot* 4268 ; 5371.
4. **A. rudis** *Oliv. & Hiern*—F.T.A. 3 : 380. *A. baoulensis* A. Chev. Bot. 370. Coarse erect hispid herb 2–4 ft. high, with white flower-heads ¾ in. across.
   Ivory Coast : Baoulé-Nord, Mt. Kangoroma, near Fétékro (July) ! Gold Coast : Afram Plains (Dec.) ! N. Nigeria : Nupe ! Yola, Bornu Road (July) ! Also in Prince's Island. Exsicc.—*Barter* 1292. *Dalz.* 30. *Irvine* 887. *Chev*. 22174.
5. **A. helianthoides** *Oliv. & Hiern*—F.T.A. 3 : 381. Erect harshly-pubescent herb 1–3 ft. high with white or pale-yellowish flower-heads ½–¾ in. across.
   French Guinea : Kankan ! Kouroussa ! Futa-Jallon ! Gold Coast : Achimota (June) ! Accra ! Togo : Atikpui ! N .Nigeria: Lokoja (Sept.) ! Nupe ! Abinsi (Aug.) ! Bauchi Plateau, Jos (June) !

S. Nigeria Lagos Colony ! Abo ! Also in Gabon. Exsicc.—*T. Vogel* 20 ; 27. *Ansell. Barter* 370 ; 1293. *Baikie. Rowland. Phillips* 9. *Dalz.* 660. *Lely* 312. *Irvine* 704. *Schlechter* 12983. (See Appendix).

6. **A. Kotschyi** *Benth. & Hook. f.*—F.T.A. 3 : 381. Erect roughly hispid 1–4 ft. high, with flower-heads ¾ in. across, usually deep red-purple, occasionally white.
French Sudan : San (Sept.) ! Yatenga-Nord (Aug.) ! Senegal: Mbidjem ! N. Nigeria : various localities ! S. Nigeria : Idah (Sept.) ! Abo ! Extends to E. Sudan, E. Africa and Angola. Exsicc.—*T. Vogel. Barter* 338. *Baikie. Dalz.* 167 198. *Moiser* 164. *Talb.* (no number).

7. **A. angustifolia** *Oliv. & Hiern*—F.T.A. 3 : 380. Erect very scabrid 2–3 ft. high, with pale yellow flower-heads ¾ in. across.
N. Nigeria : Nupe ! Kontagora (Nov.) ! Exsicc.—*Barter* 1007 ; 1185. *Dalz.* 195.

8. **A. linearifolia** *Oliv. & Hiern*—F.T.A. 3 : 380. Erect harshly-hispid herb, with yellow flowers 1 in. or more across.
Nigeria : ? Lokoja ! Exsicc.—*Baikie.*

### 12. **MELANTHERA** Rohr.—F.T.A. 3 : 381.

Scales of the receptacle gradually long-setose-acuminate, barbellate, the outer ones pectinato-ciliate ; leaves ovate-triangular, 4·5–7 cm. long, about 3 cm. broad, pilose on both surfaces ; peduncles slender ; involucral bracts lanceolate, setose outside 1. *gambica*

Scales of the receptacle rather abruptly acuminate or triangular at the apex :

Leaves petiolate :

Leaves broadly ovate, opposite, rounded or subcordate at the base, acutely acuminate, 7–11 cm. long, 4–6 cm. broad, scabrid-setulose on both surfaces, crenate, with 3 prominent nerves from the base ; petiole slender, 2–3 cm. long ; flower-heads few, solitary or subsolitary on long slender peduncles ; outer involucral bracts ovate-lanceolate, acute, appressed-setulose outside ; receptacular bracts acutely acuminate, keeled, slightly setulose towards the top ; achenes trigonous or quadrangular ; pappus of 8–10 short rigid unequal bristles .. .. .. 2. *Brownei*

Leaves oblong to ovate-elliptic, shortly and narrowly contracted at the base, not acuminate, 4–8 cm. long, 2–4 cm. broad, closely scabrid-setulose on both surfaces, prominently 3-nerved above the base ; petiole about 1 cm. long ; flower-heads rather numerous, paniculate (in mature specimens) ; involucral bracts setulose with grey hairs outside ; receptacular bracts triangular at the apex ; achenes quadrangular ; pappus of 4 weak short setae .. .. .. 3. *elliptica*

Leaves subsessile, oblong-lanceolate, broadly cuneate at the base, 6–9 cm. long, 2–2·5 cm. broad, setulose-scabrid on both surfaces, crenulate ; flower-heads as in *M. Brownei* .. .. .. .. .. .. .. .. 4. *sokodensis*

1. **M. gambica** *Hutch. & J. M. Dalz.* in Kew. Bull. 1931 : ined. Erect rather roughly-pubescent herb 18 in. high, with yellow flower-heads ¾–1 in. in diameter.
Gambia : ? locality ! Exsicc.—*Hayes* 586.

2. **M. Brownei** *Schultz Bip.*—F.T.A. 3 : 382 ; Chev. Bot. 371. *M. djalonensis* A. Chev. Bot. 372. A branched scabrid herb usually scrambling or scandent, with rather broad leaves and yellow radiate flower-heads ¾–1 in. or more in diameter.
Common from French Guinea to Cameroons, north to Nupe in N. Nigeria, and Fernando Po ! Extends to Congo, E. Africa and south to Natal. Exsicc.—*T. Vogel* 19 ; 42. *Barter* 297 ; 1297. *Irving. Mann* 59. *Cummins* 244. *Johnston* 44. *Farmar* 556. *Dunlap* 86. *Pobéguin* 329. *Preuss* 1149.

3. **M. elliptica** *O. Hoffm.* in Engl. Bot. Jahrb. 24 : 474. *M. Chevalieri* O. Hoffm. & Muschler. *M. rhombifolia* O. Hoffm. & Muschler. Erect, branched perennial herb woody below, 3–5 ft. high with ribbed stems, wrinkled leaves and hemispherical yellow flower-heads 1 in. in diameter including the rays.
French Sudan : Tiédiana (June) ! Togo ! N. Nigeria : Zaria (Feb.) ! Bauchi Plateau, plains between Hepham and Ropp, 4,600 ft. (July) ! Also in Cameroons and Upper Ubangi-Shari. Exsicc.—*Dalz.* 361. *Lely* 379. *Chev.* 999. *Büttner* 34.

4. **M. sokodensis** *Muschler* ms.
Togo : Sokode Farm, 1,000 ft. (Oct.) ! Exsicc.—*Schröder* 73.

### 13. **ECLIPTA** Linn.—F.T.A. 3 : 373.

A herb covered all over with short scabrid appressed hairs ; leaves opposite, lanceolate or narrowly ovato-lanceolate, subacute, shortly narrowed at the base, 4–10 cm. long, 1–3 cm. broad, distantly serrate, trinerved from well above the base ; flower-heads axillary and terminal, about 1 cm. diam. ; peduncle slender, up to 3 cm. long ; bracts few, imbricate, ovate-orbicular ; ray-flowers very small, white ; achenes dentate at the apex, finely tuberculate .. .. .. .. .. .. *alba*

**E. alba** *Hassk.*—F.T.A. 3 : 373 ; Stapf 615 ; Holl. 3 : 384 ; Chev. Bot. 369. Decumbent or erect annual up to 2 ft. or more high, with rough leaves and stems, and white flower-heads ¼–⅓ in. across.
A common weed of farms and waste places in warm countries. (See Appendix).

### 14. **VERBESINA** Linn. Sp. Pl. 901.

Stems pubescent ; leaves ovate-triangular, about 7 cm. long, dentate, whitish below with short appressed hairs ; flower-heads on long peduncles, about 4 cm. diam., involucral bracts linear, 1 cm. long ; ray-flowers deeply lobed at the apex ; achenes obovate, with a broad white wing ; pappus-bristles 2, smooth .. *encelioides*

**V. encelioides** *Benth. & Hook. f.* ex *A. Gray* in Bot. Calif. 1 : 350. *Ximenesia encelioides* Cav.—F.T.A. 3 : 383.
Introduced from tropical America and recorded from Walo, Senegambia, by *Perrottet* (see F.T.A. 3 : 383).

### 15. **SPILANTHES** Linn.—F.T.A. 3 : 383.

Annual ; stems glabrous ; leaves opposite, more or less ovate or ovate-triangular, rounded or obtuse at the apex, truncate to acute at the base, 2·5–5 cm. long, 1·5–

2·5 cm. broad, glabrous; flower-heads solitary, on slender peduncles, more or less ovoid, about 1 cm. or more long; bracts few, about ½–⅓ as long as the head; ray-flowers small or absent; achenes subtended by the paleae, black, with a line of hairs up each side and two short slender setae at the apex .. .. .. *Acmella*

S **Acmella** *Linn.*—F.T.A. 3 : 384; Stapf 615; Holl. 3 : 389; Chev. Bot. 372. Herb, creeping at the base, ascending, with conical or convex yellow flower-heads ¼–⅓ in. long.

In damp places and cultivated ground, variable, occurring in the warmer parts of the world. Exsicc.—*T. Vogel* 41. *Barter* (no number). *Sc. Elliot* 3891. *Millen* 196. *Whyte.* *Foster* 345. *Lely* 233. (See Appendix).

### 16. ENHYDRA Lour.—F.T.A. 3 : 372.

Stems elongated, rooting in the lower part, glabrous; leaves opposite, sessile, linear or linear-lanceolate, 5–8 cm. long, entire or distantly serrate, finely puberulous and minutely glandular below; flower-heads very few, axillary, sessile, nearly 1 cm. diam.; involucral bracts 4, broad, leafy; receptacle with ribbed paleae closely sheathing the flowers; achenes oblong, without a pappus .. .. *fluctuans*

**E. fluctuans** *Lour.*—F.T.A. 3 : 372. A perennial herb of swamps, rooting below, with white or yellowish white sessile flower-heads ¼–½ in. in diameter.

Gold Coast: Accra Plains (July)! S. Nigeria: Calabar R. (Feb.)! Fernando Po (June, Nov.)! Widely spread in the tropics. Exsicc.—*T. Vogel* 218. *Barter* (no number). *Mann* 428; 2320. *Irvine* 739.

### 17. ACANTHOSPERMUM Schrank—Benth. & Hook. f. Gen. Pl. 2 : 349.

A much-branched herb; stems pilose-pubescent; leaves sessile, obovate, obtuse or subacute, gradually cuneate at the base, 4–5 cm. long and 2–2·5 cm. broad, thinly pubescent on both surfaces; flower-heads axillary, solitary, sessile; ripe achenes divergent, usually about 5 together, armed with hooked bristles .. *hispidum*

**A. hispidum** *DC.* Prod. 5 : 522. *A. humile* A. Chev. Bot. 368, partly, not of DC. A weed of waste places and fields, with pale yellow flowers and echinate fruits.

Native of America now widely spread! Exsicc.—*Farmar* 16. *Dalz.* 1413; 8121. *N. W. Thomas* 7029. *Deighton* 476. *Irvine* 692. *Debeaux* 310. *Chev.* 2065; 16077.

### 18. GYNURA Cass.—F.T.A. 3 : 401.

Flowers yellow or orange:

Erect or subscandent herbs; leaves with numerous teeth or lobes:

Leaves sessile, auriculate at the base, coarsely dentate to deeply pinnately lobed, up to 15 cm. long and 10 cm. broad, thinly pubescent on both surfaces; flower-heads few, corymbose; calycular and involucral bracts scabrid-pubescent outside, the latter about 1 cm. long .. .. .. .. .. .. 1. *amplexicaulis*

Leaves petiolate:

Leaves not lobed:

Leaves ovate-triangular, coarsely and doubly dentate, 4–10 cm. long, 3–6 cm. broad, slightly pubescent on the nerves below; flower-heads solitary on long peduncles, about 2 cm. diam.; involucral bracts setulose .. 2. *vitellina*

Leaves broadly lanceolate, cuneate at the base, acute, 5–6 cm. long, 2–2·5 cm. broad, coarsely repand-dentate, puberulous on both surfaces; petiole slightly auriculate at the base; flower-heads solitary on long peduncles; involucral bracts scabrid-setulose outside, about 1 cm. long, the outer ones subfiliform 3. *gracilis*

Leaves more or less deeply pinnately lobed .. .. .. 7. *crepidioides*

Climbing; leaves with very few recurved or spreading teeth, elliptic, acutely triangular at the apex, cuneate at the base, 4–7 cm. long, 2–3 cm. broad, shortly pubescent on the lower surface, with about 5 pairs of lateral nerves; flower-heads few on a short or long peduncle; calycular bracts several, ⅓ as long as the involucre; involucral bracts about 15, glabrous, 1·5 cm. long; flowers orange-yellow 4. *sarmentosa*

Flowers purple, red or blue:

Heads solitary or subsolitary, on long slender peduncles:

Involucral bracts glabrous, about 1·3 cm. long, the calycular ones setulose-denticulate; leaves obovate-oblanceolate, auriculate at the base, more or less sinuately lobed, very slightly pubescent .. .. .. .. .. .. 5. *cernua*

Involucral bracts glabrous; leaves oblanceolate, narrowed to the base, dentate, glabrous .. .. .. .. .. .. .. .. 6. *liberica*

Involucral bracts setulose outside, 1·5 cm. long; leaves linear, coarsely and sparingly dentate or pinnately lobed, about 14 cm. long, slightly pubescent 7. *baoulensis*

Heads several to numerous, corymbose, cylindric, on short peduncles:

Flowers red; involucral bracts glabrous or slightly setulose, 1 cm. long; leaves not auriculate at the base, coarsely sinuate-dentate or rarely deeply pinnately lobed, lobes coarsely toothed, glabrous or nearly so .. .. .. 8. *crepidioides*

Flowers bright blue; heads narrowly cylindric, about 1 cm. long; bracts sparingly setose, sharply reflexed in fruit; leaves deeply pinnately lobed, about 7 cm. long, lobes oblong, denticulate, sparingly setulose below; ultimate peduncles very slender; achenes strongly ribbed.. .. .. .. .. .. 9. *caerulea*

1. **Gynura amplexicaulis** *Oliv. & Hiern*—F.T.A. 3 : 403. Stems mostly erect from a stout root 1–2 ft. or more high, sometimes prostrate, with oblong flower-heads golden or orange-yellow ½–⅓ in. long.
   Gambia ! Sierra Leone : Kaballa (Sept.) ! Falaba (Mar.) ! N. Nigeria : Sokoto, in fields (Sept.) ! Abinsi, Agwagwa village (cultivated near Munchi houses, June) ! Bauchi Plateau, Vom, 3,000–4,500 ft., in bush after fires ! Cameroons Mt.: Bamenda ! Also in E. Sudan. Exsicc.—*Brown-Lester* 40. *Sc. Elliot* 5143. *Dalz.* 406 ; 656. *Dent Young* 157. *Migeod* 481. (See Appendix).
2. **G. vitellina** *Benth.*—F.T.A. 3 : 402. Ascending from a procumbent rooting base or erect 2–6 ft. high in forest openings, nearly glabrous or slightly pubescent, with yellow flower-heads subhemispherical ¾–1 in. broad.
   Cameroons Mt. forest, 5,000–7,000 ft. (Jan., Nov.) ! Fernando Po, on sea cliffs and at 8,500 ft. (June, Nov., Dec.) ! In tropical Africa generally. Exsicc.—*T. Vogel* 188. *Barter* (no number). *Mann* 38 ; 610 ; 1317 ; 1931. *Dunlap* 33 85. *Kalbreyer* 137. *Maitland* 307 ; 478. *Migeod* 55 234 ; 455. *Mildbr.* 10807.
3. **G. gracilis** *Hook. f.* ex *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Senecio picridifolius* A. Chev. Bot. 375, not of DC. Herb with sulcate setulose-pubescent stems prostrate or ascending, and yellow flowers.
   French Sudan : Sicoro, on banks of the Bankoni (Jan.) ! Dendéla, in a drying-up marsh (Mar.) ! French Guinea Futa-Jallon, Labé ,3,000 ft. (Mar.) ! Mafin River bed, near Dalaba (Mar.) ! Kouria, in inundated ground (Aug.) ! Kouria to Irébéléya (Sept.) ! Cameroons Mt., 7,000 ft. (Jan.) ! Exsicc.—*Mann* 1317. *Chev.* 222 ; 635 ; 12239 ; 15063 ; 18074 ; 18257. *Maitland* 650 ; 955.
4. **G. sarmentosa** *DC.* Prod. 6 : 298. *G. Buntingii* S. Moore. A scandent herb with striate stems, half-succulent leaves and yellow or orange flower-heads ½–¾ in. long.
   Sierra Leone : Hill Station (Oct.) ! Liberia : Begwai, on old farms (Sept.) ! Gold Coast : Akropong Oct.) ! Hemang, Prah R. (Sept.) ! S. Nigeria : Lagos, Ikoyi (Aug.) ! A native of the Eastern Tropics, possibly escaped from cultivation. Exsicc.—*Johnson* 823. *Chipp* 572. *Dalz.* 1410. *Deighton* 240. *Bunting* 122. (See Appendix).

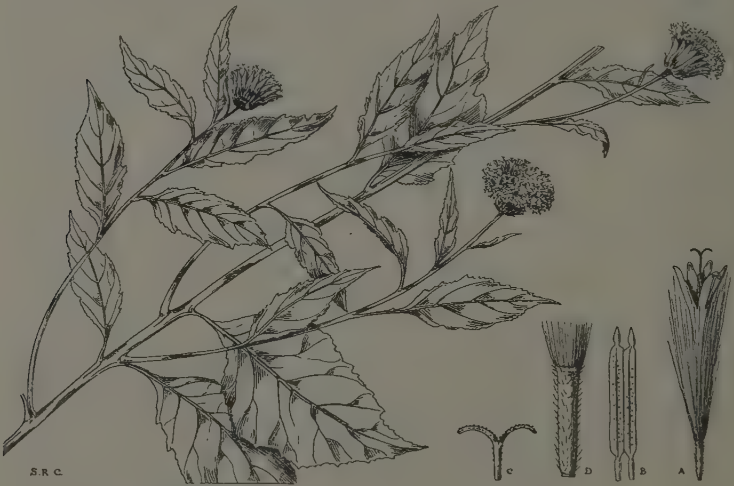

FIG. 219.—GYNURA GRACILIS *Hook. f.* (COMPOSITAE).
A, flower. B, anthers. C, style-arms. D, achene.

5. **G. cernua** *Benth.*—F.T.A. 3 : 402 ; Holl. 3 : 390 ; Chev. Bot. 374. A common weed, sometimes cultivated, erect, branched, puberulous, 1–3 ft. high, with bluish-purple flower-heads, drooping in flower, erect in fruit ½–⅔ in long.
   Tropical Africa and the Mascarene Islands ! Exsicc.—*T. Vogel* (no number). *Barter* 54 ; 1082. *Johnson* 784. *Sc. Elliot* 3879 ; 4059. *Chev.* 22421, partly. *Warnecke* 296. (See Appendix).
6. **G. liberica** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Crassocephalum libericum* S. Moore. Prostrate nearly glabrous herb with ascending slender branches, shortly petiolate leaves and pink flower-heads ⅓ in. long.
   Liberia : Begwai (Oct.) ! Exsicc.—*Bunting* 142.
7. **G. baoulensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A herb 2–3 ft. high with pilose stems and crimson flowers.
   Ivory Coast : Baoulé-Sud, between Toumodi and Dimbokro (Aug.) ! Exsicc.—*Chev.* B. 22259.
8. **G. crepidioides** *Benth.*—F.T.A. 3 : 403 ; Chev. Bot. 374. Erect, usually branched herb, pubescent or nearly glabrous, 2–3 ft. high, with red-purple-tipped oblong flower-heads, ⅓–½ in. long.
   Tropical Africa and the Mascarene Islands ! Cameroons Mt. 3,000–5,000 ft. ! Exsicc.—*Heudelot* 785. *T. Vogel* 139. *Barter* 1809. *Mann* 51. *Moloney*. *Millen* 51. *Dunlap* 87 ; 150. *Maitland* 268 ; 477. (See Appendix).
9. **G. caerulea** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Erect branched herb 1–1½ ft. high, thinly setose, with narrow flower-heads, bright blue, ⅓ in. long.
   N. Nigeria : Bauchi Plateau, Vom, 3,000–4,500 ft. ! Exsicc.—*Dent Young* 158.

### 19. NOTONIA DC.—F.T.A. 3 : 406.

Stems simple from a tuberous rootstock, glabrous ; stem-leaves much reduced, ovate-lanceolate, serrulate, fleshy, glabrous, about 1 cm. long ; involucral bracts about 16, linear-oblong-lanceolate, with narrowly triangular tops, 2 cm. long, glabrous, with thin carmine margins ; corolla 2 cm. long ; achenes nearly glabrous, ribbed, about 8 mm. long ; pappus white, 2·5 cm. long .. .. .. .. .. *Dalzielii*

**N. Dalzielii** *Hutch.* in Kew Bull. 1931 : ined. Erect herb 6–8 in. high (without basal leaves in the specimen collected), with red-purple flower-head $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, and a depressed-globose tuber 3 in. in diameter with acrid juice.

N. Nigeria : Katagum district, Gimi (Feb.) ! Exsicc.—*Dalz.* 351.

### 20. EMILIA Cass.—F.T.A. 3 : 405 ; Garabedian in Kew Bull. 1924 : 137.

Leaves lyrate, with a narrow winged petiole-like basal portion, more or less auriculate at the base, up to 10 cm. long and 5 cm. broad, upper segment more or less triangular, dentate, glabrous or nearly so ; flower-heads few, corymbose, on very slender peduncles ; involucral bracts about as long as the flowers, 1 cm. long, glabrous ; pappus white ; achenes minutely papillous on the ribs .. .. 1. *sonchifolia*

Leaves sessile, cordate-auriculate at the base, ovate, rather coarsely repand-dentate, up to 12 cm. long and 7 cm. broad, glabrous ; flower-heads 3 or 4 together, on slender peduncles ; involucral bracts much shorter than the flowers, glabrous ; achenes papillous only on the ribs .. .. .. .. .. .. .. 2. *sagittata*

Leaves linear, sometimes with one or two short lateral lobes near the middle, glabrous or nearly so, thin, 2–6 cm. long ; flower-heads small and neat, cymose-corymbose ; peduncles up to 1 cm. long, slender ; involucral bracts about 12, free to the base, about 4 mm. long ; flowers about 12, loosely arranged ; achenes glabrous ; pappus of very few soon deciduous bristles, barbellate .. .. .. 3. *guineensis*

1. **E. sonchifolia** *DC.*—F.T.A. 3 : 405 ; Holl. 3 : 391. Herb a few inches to 2 ft. high, usually glabrous and more or less glaucous, with purplish cylindrical flower-heads about $\frac{1}{2}$ in. long.

French Guinea : Konakry, wild in cultivated ground. Sierra Leone : Freetown, Heddle's Farm (May) ! Njala (Sept.) ! Gold Coast : Accra Plains ! Assuantsi (Feb.) ! S. Nigeria : Lagos, in native gardens and waste places (Oct.) ! A weed of the Old World tropics introduced into America. Exsicc.—*Dalz.* 1165. *Deighton* 1189 ; 2080. *Irvine* 400. *Lloyd Williams* 3. (See Appendix).

2. **E. sagittata** *DC.*—F.T.A. 3 : 405 ; Stapf 615 ; Holl. 3 : 390. A glaucous herb, erect or scrambling to a length of several feet, the leaves sometimes purple below, with bright or dark-yellow flower-heads $\frac{1}{2}$–$\frac{2}{3}$ in. long.

Throughout the area ; Cameroons Mt., up to 5,000 ft. ! In the tropics and subtropics generally. Exsicc.—*Barter* 180 ; 1751. *Irving* 79. *Mann* 731. *Sc. Elliot* 3852 ; 3998 ; 5077. *Johnson* 1101. *Farmar* 428. *Whyte*. *G. P. Cooper* 8. (See Appendix).

3. **E. guineensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Lactuca tenerrima* A. Chev. Bot. 379, not of Pourret. Erect slender-branched herb 18 in. high, with numerous yellowish flower-heads $\frac{1}{4}$ in. long.

French Guinea : Bowal to Bouria (Nov.) ! Bilima (Sept.) ! Futa-Jallon, Timbo, Ditinn, Irébéléya and Kouria district (Sept.) ! Exsicc.—*Caille* in *Herb. Chev.* 14702 ; 15037. *Chev.* 18276 ; 18291 ; 18449 ; 18458.

### 21. SENECIO Linn.—F.T.A. 3 : 408.

Trees ; internodes very short ; leaves oblong-oblanceolate, acute, narrowed into a rather long petiole at the base, up to about 40 cm. long and 10 cm. broad, slightly pubescent on the numerous lateral nerves below, closely serrate ; flower-heads numerous in branched panicles ; involucral bracts few, about 8 mm. long, glabrous, calycular bracts few, pubescent ; pappus white ; achenes pubescent .. 1. *Mannii*

Climbers ; stems more or less succulent ; leaves more or less triangular, subhastate at the base and sometimes with a pair of lateral segments below, long-petiolate, 5–8 cm. long, 3–5 cm. broad, coarsely repand-dentate, glabrous ; flower-heads numerous and densely clustered in a panicle ; involucral bracts 1 cm. long, glabrous ; achenes glabrous.. .. .. .. .. .. .. .. .. .. 2. *Biafrae*

Erect herbs or fleshy shrubs :

Fleshy shrub, leafless or nearly so at time of flowering ; branches rough with the scars of the fallen leaves, the latter small and spathulate ; flower-heads densely fasciculate-corymbose ; peduncles 1–2 cm. long, slender, bracteolate ; involucral bracts about 10, glabrous, 1·5 cm. long ; flowers whitish, no rays ; achenes glabrous 3. *Cliffordianus*

Herbs :

Leaves woolly-tomentose with white hairs, broadly oblanceolate, acutely acuminate, narrowed to and auriculate at the base, up to 20 cm. long and 6 cm. broad, closely denticulate, with numerous faint lateral nerves ; flower-heads rather numerous and corymbose ; involucral bracts 1 cm. long, slightly lanate, keeled ; ray-flowers 1·5 cm. long, with numerous nerves ; achenes glabrous .. .. 4. *Burtonii*

Leaves glabrous or nearly so below :

Leaves entire, sessile, lanceolate or linear-lanceolate, 2–4 cm. long, up to 0·8 cm. broad, glabrous, with 3–5 ascending nerves ; flower-heads campanulate, on long naked peduncles ; bracts 1·5 cm. long, glabrous ; ray-flowers small ; achenes ribbed, pubescent .. .. .. .. .. .. .. .. 5. *baberka*

Leaves toothed or lobed :

Stem-leaves broad and auriculate at the base, coarsely and doubly dentate or lobulate :

Involucral bracts 1 cm. long, pubescent ; leaves oblong in outline, up to 15 cm. long and 4 cm. broad, lobes doubly dentate ; achenes glabrous 6. *clarenceanus*

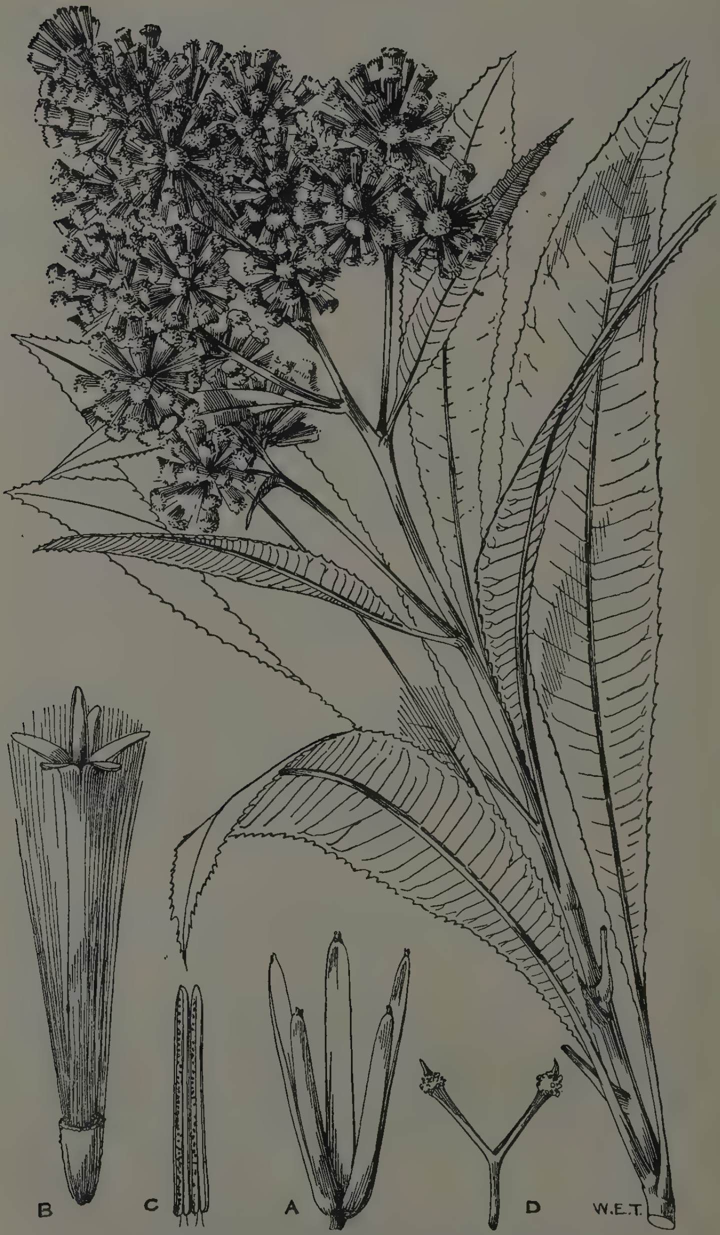

FIG. 220.—SENECIO MANNII *Hook. f.* (COMPOSITAE).
A, involucre. B, flower. C, anthers. D, style-arms.

Involucral bracts 5 mm. long, glabrous ; leaves more or less oblanceolate, irregularly lobulate, up to 10 cm. long ; achenes pubescent .. 7. *Perrottetii*

Stem-leaves narrow at the base, at most shortly dentate :

Flower-heads about 1·5 cm. long ; leaves mostly spathulate-oblanceolate, the basal ones up to 10 cm. long including the slender petiole scabrid, toothed ; achenes pubescent all over .. .. .. .. .. .. 8. *Lelyi*

Flower-heads 1 cm. long ; leaves linear in outline, deeply pinnately lobed, about 3 cm. long, carmine below ; achenes softly grey-tomentose all over 9. *hoggarienni*

Flower-heads about 6 mm. long, on slender peduncles ; leaves spathulate, repand-dentate, slightly setulose, up to 4 cm. long ; achenes shortly pubescent on the ribs .. .. .. .. .. .. .. .. 10. *abyssinicus*

1. **Senecio Mannii** *Hook. f.*—F.T.A. 3 : 418. A tall shrub or small soft-wooded tree 15–25 ft. high, nearly glabrous, with narrow oblong yellow flower-heads ¼–⅓ in. long in dense panicles.
Cameroons Mt. 2,500–7,000 ft. (Feb., Dec.) ! Fernando Po, 6,000 ft. ! Exsicc.—*Mann* 282 ; 1185 ; 1935 ; *Dalz.* 8226. *Maitland* 236 ; 985. *Migeod* 374.

2. **S. Biafrae** *Oliv. & Hiern*—F.T.A. 3 : 420. *S. gabonicus* A. Chev. Bot. 375, not of Oliv. & Hiern. *Crassocephalum Biafrae* S. Moore. A glabrous climber, succulent, with leaves sometimes 3-partite, and greenish-yellow panicled flower-heads ⅓–½ in. long ; sometimes cultivated. French Guinea : Bilima (Dec.) ! Sierra Leone : Talla Hills, Mt. Gonkwi (Feb.) ! Gold Coast : Aburi (Feb.) ! Dahomey : Sakété to Pedjilé (Feb.) ! S. Nigeria : Lagos ! Ebute Metta (Jan.) ! Obompa (Jan.) ! Oban ! Cameroons Mt., 7,000 ft. (Jan.) ! Exsicc. —*Mann* 1325. *Moloney*. *Millen* 96. *Sc. Elliot* 4837. *Johnson* 961. *N. W. Thomas* 2234. *Talb.* 1549. *Chev.* 14880 ; 22913. (See Appendix).

3. **S. Cliffordianus** *Hutch.* in Kew Bull. 1921 : 250. A " Euphorbia-like " shrub, 2–5 ft. high (leafless in the specimens collected) with greenish-white flowers ¾–1 in. long in terminal umbel-like fascicles ; habitat in crevices of rocks.
N. Nigeria : Bauchi Plateau, near Jos (Mar.) ! Vom, 3,000–4,500 ft. ! Naraguta ! Exsicc.—*Hill* 14. *Dent Young* 161. *Lely* P. 103.

4. **S. Burtonii** *Hook. f.*—F.T.A. 3 : 416. A robust erect perennial herb 4–5 ft. high, with ribbed stems, hoary leaves and yellow campanulate flower-heads ½ in. long.
Cameroons Mt., 8,000–12,000 ft. (Dec., Jan., Feb.) ! Exsicc.—*Mann* 1246 ; 1929. *Johnston* 50. *Miss Kingsley*. *Dalz.* 8320. *Deistel* 613. *Mildbraed* 10851. *Maitland* 844 ; 920. *Migeod* 178.

5. **S. baberka** *Hutch.* in Kew Bull. 1913 : 180 ; Holl. 3 : 391. Annual stems a few inches to 1 ft. high from a woody stock, lower leaves rosulate, with bright yellow flower-heads ½–⅔ in. long ; appearing after the bush fires.
N. Nigeria : north of Zaria (Feb.) ! Bauchi Plateau : Naraguta (Jan.) ! Jos (Mar.) ! Vom, 3,000–4,500 ft. ! Exsicc.—*Dalz.* 390. *Hill* 13. *Lely* P. 37 ; 59. *Dent Young* 160.

6. **S. clarenceanus** *Hook. f.*—F.T.A. 3 : 418. Erect perennial herb up to 5 ft. high, with ribbed stems and orange-red or purplish flower-heads ⅓ in. long.
Cameroons Mt. 7,000–11,000 ft. or almost to the summit (Dec., Jan., Feb.) ! Fernando Po, 9,000 ft. (Dec.) ! Exsicc.—*Mann* 609 ; 1237 ; 1923. *Johnston* 54. *Dalz.* 8319. *Deistel* 561. *Mildbraed* 10840 ; 10921. *Maitland* 815 ; 958 ; 972 ; 1029. *Migeod* 195.

7. **S. Perrottetii** *DC.*—F.T.A. 3 : 412. An erect glabrous annual, sometimes procumbent and rooting at the base, 1–2 ft. high, with rather small purplish campanulate flower-heads ¼ in. long.
Senegal : Richard Tol, etc. (Jan.) ! Sierra Leone : Kanya (Oct.) ! Bumban (Aug.) ! Exsicc.—*Roger*. *Döllinger* 65. *Perrottet*. *N. W. Thomas* 3090. *Deighton* 1252 ; 1253.

8. **S. Lelyi** *Hutch.* in Kew Bull. 1921 : 382. Erect herb with striate glandular-pubescent subsimple stems 1½–2 ft. high from a hard base, and yellow flower-heads ⅓ in. long.
S. Nigeria : Bamenda ! N. Nigeria : Bauchi Plateau, plains between Hepham and Ropp, 4,600 ft. (July) ! Naraguta, in farm land (Jan.) ! Exsicc.—*Lely* P. 89 ; 356 ; 364. *Migeod* 364 ; 479.

9. **S. hoggariensis** *Battand. & Trab.* in Bull. Soc. Bot. France 68 : 626. A pretty mauve-flowered herb about 8 in. high.
French Sudan : Central Sahara ; Silet, 2,500 ft., weed in irrigated barley plot (Mar.) ! Exsicc.—*Chipp* 114.

10. **S. abyssinicus** *Sch. Bip.*—F.T.A. 3 : 410 ; Holl. 3 : 391. Erect annual usually branched, 6–18 in. high, with striate nearly glabrous or sparsely pilose stems and small campanulate-oblong yellow flower-heads scarcely ¼ in. long.
N. Nigeria : Bauchi Plateau, Naraguta (Jan.) ! Vom, 3,000–4,500 ft. ! S. Nigeria : Ogun R. (in yam fields) ! Lagos ! In tropical Africa generally. Exsicc.—*Millen* 121. *Dodd* 433. *Lely* P. 31 32. *Dent Young* 159.

*Imperfectly known Species.*

**S. tenuicaulis** *Muschler* in Engl. Bot. Jahrb. 43 : 60.
Togo.—Not found in the Berlin Herbarium.

## 22. COTULA Linn.—F.T.A. 3 : 397.

A small herb with woolly stems and leaves, the latter deeply pinnately divided, acute ; flower-heads very small and numerous, shortly stalked, 4–5 mm. diam. ; involucral bracts 2-seriate, oblong, with thin scarious margins ; achenes narrowly winged ; receptacle nearly flat and prominently tuberculate after the fall of the flowers 1. *anthemoides*

1. **C. anthemoides** *Linn.*—F.T.A. 3 : 397. Spreading or prostrate herb a few inches long, with small spherical yellow flower-heads scarcely ¼ in. in diameter.
Senegal (*Perrottet*, not seen). Common in the warmer parts of the Old World.

## 23. MATRICARIA Linn.—F.T.A. 3 : 396.

A tall herb with glabrous stems ; leaves bipinnate, up to 5 cm. long, glabrous, segments linear ; peduncles elongated, up to 20 cm. long ; flower-heads 1 cm. diam., depressed-globose ; involucral bracts 3–4-seriate, oblong-lanceolate, up to 5 mm. long, with wide hyaline margins .. .. .. .. .. .. .. .. *auriculata*

**M. auriculata** *Benth. & Hook. f.* A herb 2 ft. high, with grey-green foliage and dull yellow flowers.
French Sudan : Tamanrasset, 4,320 ft., side of irrigation ditch (Mar.) ! Extends to Palestine and Arabia. Exsicc.—*Chipp* 20.

## 24. **ARTEMISIA** Linn.—F.T.A. 3 : 400.

Branchlets rather densely leafy, softly grey-tomentellous ; leaves very short, about 0·5 cm. long, petiolate, softly pubescent and gland-dotted, deeply divided into several subturgid segments 1–2 mm. long ; flower-heads racemose on short lateral branchlets, subsessile, about 5 mm. diam. ; involucral bracts yellowish, elliptic, softly and rather thinly pubescent .. .. .. .. .. .. .. .. *Maciverae*

A. **Macivarae** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A yellow flowered highly scented bush with a woody base.

French Sudan : Central Sahara ; 32 miles west of Tamanrasset, 3,430 ft., common in sandy oueds with *Tamarix* (Mar.) ! Exsicc.—*Chipp* 29.

## 25. **MICROGLOSSA** DC.—F.T.A. 3 : 308.

Leaves ovate or ovate-elliptic, fairly long petiolate :

Leaves entire or subentire, acutely acuminate, 6–10 cm. long, 3–5 cm. broad, slightly pubescent below ; flower-heads numerous, in laxly branched terminal corymbs ; involucral bracts 4–5-seriate, slightly pubescent ; achenes ribbed, pubescent ; pappus slightly reddish .. .. .. .. .. .. 1. *volubilis*

Leaves coarsely serrate-dentate, acutely acuminate, 8–10 cm. long, 3–5 cm. broad, slightly scabrid above, shortly pubescent below ; lateral nerves about 5 pairs ; petiole 1–1·5 cm. long ; flower-heads densely crowded in a terminal corymb ; involucral bracts 3–4-seriate, 3–4 mm. long ; achenes slightly pubescent ; pappus 4 mm. long, pale .. .. .. .. .. .. .. .. 2. *densiflora*

Leaves linear-lanceolate to broadly lanceolate, gradually narrowed into the petiole or to the base :

Leaves sessile or subsessile :

Leaves glabrous or nearly so, with long subulate tips, entire or slightly toothed towards the apex, 5–8 cm. long, 1·5–2·5 cm. broad, very thin ; flower-heads rather few, terminal or terminating lateral branchlets ; outer involucral bracts ovate, nearly glabrous ; achenes ribbed, pubescent .. .. .. .. .. 3. *Afzelii*

Leaves pubescent below, acute, lanceolate, about 5 cm. long, 1 cm. broad, scabrid above ; flower-heads corymbose, pedunculate ; involucral bracts linear, outer pubescent ; achenes slightly pubescent .. .. .. .. 4. *angolensis*

Leaves long-petiolate, broadly lanceolate, very acutely tailed-acuminate, entire, 5–8 cm. long, 1·5–2·5 cm. broad, thinly puberulous on the nerves below ; branchlets grooved, pubescent ; inflorescence as in *M. volubilis* but laxer .. .. .. 5. *caudata*

1. **Microglossa volubilis** *DC.*—F.T.A. 3 : 309 ; Chev. Bot. 362. A shrub, erect, 6 ft. or commonly more or less scandent, slightly viscid, odorous, with small creamy or pale yellow flowers abundant in terminal branched corymbs.

Common from Senegal to N. and S. Nigeria, and in tropical Africa generally ; also in Comoro and Mascarene Islands. Exsicc.—*Heudelot* 609. *T. Vogel* 16a ; 41. *Barter* 3380. *H. H. Johnston* 57. *Sc. Elliot* 3951 ; 4715. *Garrett* 30. *Cummins* 121. *Whyte. Farmar* 376. *Lely* P. 116 ; 397 ; 710. *Baumann* 425. *Warnecke* 418. *Schlechter* 13021. (See Appendix).

2. **M. densiflora** *Hook. f.*—F.T.A. 3 : 308. A climber with pubescent longitudinally grooved and pithy branches, and dense corymbs of small creamy-white flower-heads.

Cameroons Mt., at the upper edge of the forest, up to over 7,000 ft. (Dec.–Feb.) ! Also in E. Africa. Exsicc. —*Mann* 1320 ; 1915. *Kalbreyer* 123. *Dunlap* 201. *Dalz.* 8324. *Maitland* 244 ; 513.

3. **M. Afzelii** *O. Hoffm.* in Engl. Bot. Jahrb. 24 : 469 ; Chev. Bot. 362. *M. sessilifolia* Oliv. & Hiern—F.T.A. 3 : 309, partly, not of DC. Suberect but usually scandent with striate slightly pubescent branchlets becoming glabrous, and cream-white flower-heads loosely paniculate.

French Guinea : between the Kaba and the Upper Mamu (Apr.) ! Bafing R., Mau to Touba (July) ! Sierra Leone : various localities ! Liberia ! Ivory Coast : Guidéko ! Zaranou ! Soubiré ! Sassandra Port ! Dyola country ! Gold Coast : Aburi Hills (June, Oct.) ! Togo : Amedzofe (Feb., Mar.) ! Misahöhe (Mar.) ! Bismarckburg. S. Nigeria : Oban ! Also in Cameroons and Uganda. Exsicc.—*Sc. Elliot* 4818 ; 5491. *Johnson* 467 ; 972. *Farmar* 399. *Collenette* 54. *Baumann* 445. *Linder* 376. (See Appendix).

4. **M. angolensis** *Oliv. & Hiern*—F.T.A. 3 : 309. An erect shrub with pubescent striate branches and pale yellow flower-heads numerous in branched corymbose cymes.

N. Nigeria : Bauchi Plateau, between Bukuru and Hepham, 4,300 ft. (July) ! S. Nigeria : Bamenda ! Also in French Cameroons and extending to Angola. Exsicc.—*Lely* 347. *Migeod* 300.

5. **M. caudata** *O. Hoffm. & Muschler* in Bull. Soc. Bot. Fr. Mém. 8c : 113. Habit of *M. volubilis*.

French Guinea : Bowali to Kouria (July) ! Exsicc.—*Chev.* 15069.

## 26. **ERIGERON** Linn.—F.T.A. 3 : 307.

Herb ; stems glabrous ; leaves sessile, linear, acute, 3–4 cm. long, repand-denticulate, glabrous ; flower-heads few, on slender peduncles ; involucral bracts 8 mm. long, linear with filiform tips, pubescent ; flowers all tubular ; achenes thinly pubescent *Bovei*

E. **Bovei** *Boiss.* Fl. Or. 3 : 168. A blue-flowered herb 2 2½ ft. high.

French Sudan : Silet, 2,500 ft., side of irrigation ditch (Mar.) ! Tamanrasset, 4,320 ft. (Mar.) ! Also in Egypt and Arabia. Exsicc.—*Chipp* 23 ; 70 ; 79.

**Erigeron sumatrensis** *Retz.* (*E. linifolius* Willd.) and **E. canadensis** *Linn.*, occur as weeds of cultivation.

## 27. **CONYZA** Less.—F.T.A. 3 : 311.

Involucral bracts bright purple, pubescent up the middle, about 6 mm. long ; flower-heads few and crowded ; leaves linear-lanceolate, acute, 5–7 cm. long, 0·5–1·5 cm.

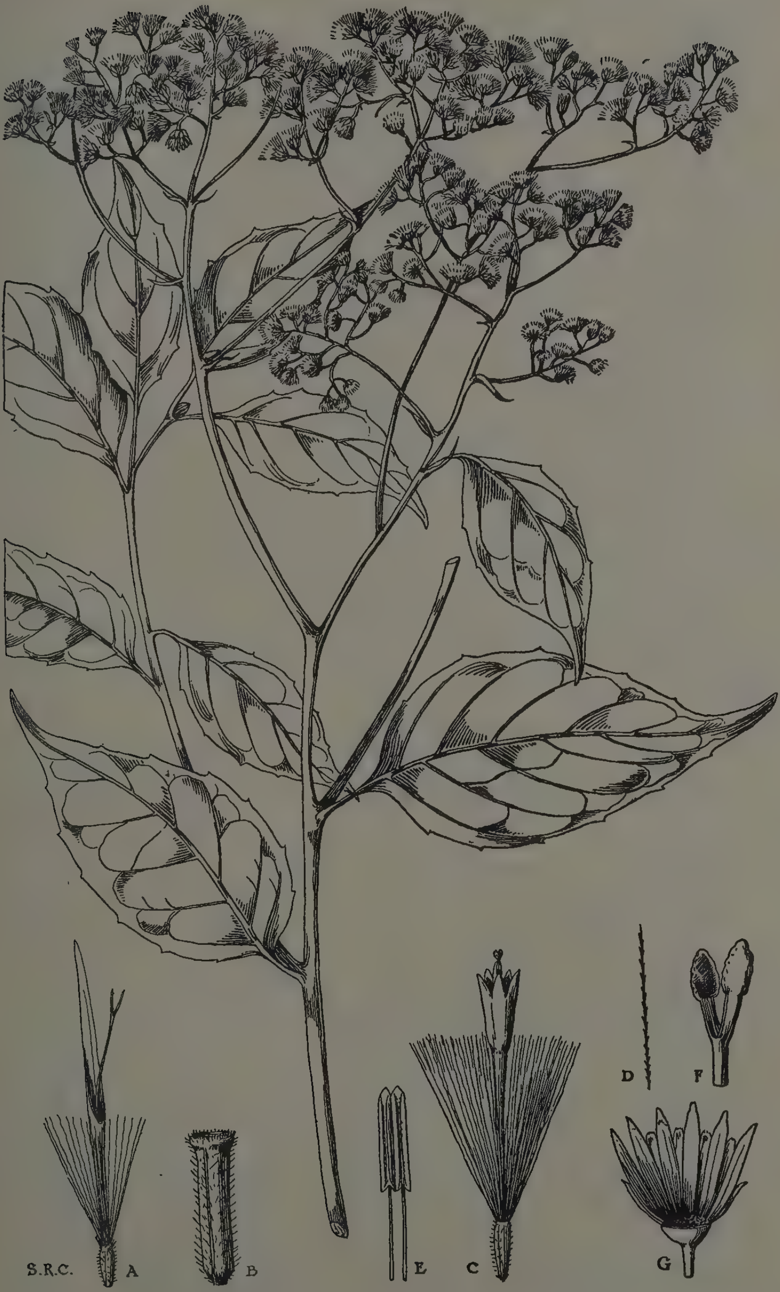

FIG. 221.—MICROGLOSSA VOLUBILIS *DC.* (COMPOSITAE).
A, female flower. B, achene. C, hermaphrodite flower. D, seta of pappus. E, stamens. F, style arms. G, part of involucre.

broad, scabrid and thinly pilose, remotely toothed; achenes glabrous; pappus whitish .. .. .. .. .. .. .. .. .. 1. *clarenceana*

Involucral bracts not purple:

Stems and leaves pilose or pubescent:

Stems and leaves very slightly pubescent; leaves oblong-lanceolate, acute, about 3 cm. long and 8 mm. broad, coarsely toothed; flower-heads forming a loose oblong panicle; peduncles slender, about 1·5 cm. long; involucral bracts about 6-seriate, linear, acute, up to 8 mm. long; pappus-bristles about 5–6 .. 2. *senegalensis*

Stems puberulous; leaves ovate, acute, about 5 cm. long and 2·5 cm. broad, denticulate, shortly tomentellous below; flower-heads corymbose; peduncles short; involucral bracts several-seriate, outer ovate-oblong, puberulous; pappus reddish 3. *Heudelotii*

Stems and leaves villous-pilose; leaves more or less pinnately lobulate, linear-lanceolate, about 5 cm. long, long-pilose and glandular; flower-heads crowded at the ends of the shoots, the peduncles elongating and persistent in the old fruiting heads; achenes puberulous; pappus-bristles about 12, white 4. *aegyptiaca*

Stems and leaves glabrous; branches ribbed; leaves linear-lanceolate, very acutely acuminate, subauriculate at the base, up to 10 cm. long and 2 cm. broad, finely serrulate; flower-heads numerous, in wide-spreading corymbs; involucral bracts linear, glabrous, 3–4 mm. long; achenes glabrous; pappus pinkish 5. *persicaefolia*

1. **Conyza clarenceana** *Oliv. & Hiern*—F.T.A. 3 : 316. Erect herb 1–2 ft. high with thinly hispid branches and whitish, purple-bracted flower-heads ⅓ in. broad crowded in a close terminal cyme.
Fernando Po, 7,500–8,500 ft. (Dec., Apr.)! Exsicc.—*Mann* 599.
2. **C. senegalensis** *Willd.*—F.T.A. 3 : 314, partly. Erect branched herb 12–18 in. high or more with pubescent striate stems and whitish flower-heads ¼–⅓ in. in diameter.
Senegal! Sierra Leone: Likuru, Talla (Feb.)! Also in Angola. Exsicc.—*Sieber* 42. *Sc. Elliot* 4956.
3. **C. Heudelotii** *Oliv. & Hiern*—F.T.A. 3 : 317.
Senegal. Exsicc.—*Heudelot.*
4. **C. aegyptiaca** *Ait.*—F.T.A. 3 : 314; Chev. Bot. 363. Annual or biennial half-woody below, erect branched 1½–3 ft. high, hairy, a weed of farms, etc., with pale yellow flower-heads ⅓–½ in. in diameter.
French Sudan: Koba (Mar.)! Senegal (Jan.)! French Guinea: between Timbo and the Upper Niger (May)! Guerzé country, Yagadou (Mar.)! Sierra Leone: Sulimania (Upper Niger, Mar.)! Rowala (July)! Gold Coast: Salaga! N. Nigeria: Abinsi (June)! Bauchi Plateau, Naraguta (Nov.)! Baradau (May)! A weed of the tropics. Exsicc.—*Roger. Sc. Elliot* 5286. *Dalz.* 654. *Lely* 92; P. 77; 717. *Krause.*
5. **C. perisicaefolia** *Oliv. & Hiern*—F.T.A. 3 : 312; Chev. Bot. 363. Erect branched herb or undershrub 2–3 ft. high or attaining 6 ft., with glabrous grooved stems and small yellow flower-heads.
French Guinea: Farana, Bembaya! Sierra Leone: Kofiu (Jan.)! Limba, Kurusu and Bafodeya (Apr.)! Gold Coast: Tarkwa (Sept.)! N. Nigeria: Katagum! Bauchi Plateau, Naraguta, Vom, Tilde Filani (May)! S. Nigeria: Ebute Metta! Abeokuta! Cameroons Mt., Buea (Feb.)! Also Gabon, Congo and Uganda and elsewhere in tropical Africa. Exsicc.—*Irving* 80. *Millen* 128. *Sc. Elliot* 4610; 5649. *Dalz.* 107; 368; 8188. *Lely* 45; 234. *Dent Young* 147. *Chev.* 20673 (partly).

## 28. ADELOSTIGMA Steetz—F.T.A. 3 : 320.

Erect annual sparingly branched in the upper part; stems thinly pilose; leaves linear in outline, deeply pinnately partite, about 5 cm. long, segments linear, about 5 mm. long, glabrous; flower-heads terminal, sessile, girt by the upper leaves, about 2 cm. diam.; involucral bracts about 3-seriate, linear, 1 cm. long or more, pubescent; outer flowers with a filiform corolla; achenes pubescent; pappus-bristles numerous, nearly white .. .. .. .. .. .. .. .. *senegalense*

**A. senegalense** *Benth.* in Hook. Ic. Pl. t. 1144—F.T.A. 3 : 320; Chev. Bot. 364. A glabrous erect annual from a few inches to 18 in. or more high with somewhat angled stems and thistle-like red- or blue-purple flower-heads; in wet places.
Senegal! French Guinea: Bouria! Bilima! Futa-Jallon, between Timbo and Ditinn! Sierra Leone: Freetown, St. George's (Oct.)! Waterloo (Oct.)! Kanya (Oct.)! Brookfields (Oct.)! Exsicc.—*Heudelot* 677. *H. H. Johnston* 19. *Lane-Poole* 408. *N. W. Thomas* 2959. *Dawe* 411. *Deighton* 244.

## 29. MICROTRICHIA DC.—F.T.A. 3 : 302.

A small herb, the lowermost leaves with long petiole; leaves obovate, rounded at the apex, narrowly cuneate at the base, up to 6 cm. long and 2 cm. broad, coarsely crenate on the margin, thinly and minutely pubescent; flower-heads in terminal subsessile clusters, about 4 mm. diam.; involucral bracts in 2–3 rows, slightly pubescent; outer flowers female, tubular; inner flowers hermaphrodite; achenes pubescent, subterete; pappus of few denticulate caducous bristles .. .. *Perrottetii*

**M. Perrottetii** *DC.*—F.T.A. 3 : 302; Chev. Bot. 361. A diffuse or tufted herb from a few inches to 1 ft. or more high, with small yellow flower-heads, with the odour of *Artemisia*.
French Sudan: San, in marshes and by streams! Senegal: ? locality! Sierra Leone: Port Lokko, on waste ground! Sendugu (June)! Njala, by the river (May)! Ivory Coast: Mankono, between the bank of the Bandama and Marabadiassa! Dahomey: Savalou, between Gouka and Banté! Atacora Mts., from Kouandé to Konkobiri! S. Nigeria: Abo! Also in Cameroons and extending to Upper Welle and E. Sudan. Exsicc.—*Heudelot* 859. *Barter* 181. *Sc. Elliot* 5858. *N. W. Thomas* 574; 8800. *Deighton* 640.

## 30. GRANGEA Adans.—F.T.A. 3 : 304.

Prostrate herb or subwoody, clothed everywhere with long white hairs; leaves pinnately partite nearly to the midrib, sessile, 5–7 cm. long, segments oblong, subacute; flower-heads depressed-globose, 1 cm. diam.; involucral bracts about 3-seriate, obovate-elliptic, strigose outside, 3–4 mm. long ; outer flowers female, in 1 or more series ; achenes subterete, scabrid, with very short and imperfect pappus-bristles *maderaspatana*

**G. maderaspatana** *Poir.*—F.T.A. 3 : 304 ; Holl. 3 : 383 ; Chev. Bot. 361. A hairy herb usually with prostrate branches from a woody root, odorous, with yellow flower-heads.

Tropical Africa generally, Egypt and tropical Asia. Exsicc.—*Döllinger* and others. *Barter* 1200. *Dalz.* 174.

## 31. CERUANA Forsk.—F.T.A. 3 : 304.

Branchlets pilose ; leaves obovate-oblanceolate, narrowly auriculate at the base, coarsely crenate in the broader part of the blade, 3–5 cm. long, about 2 cm. broad, thinly pilose on both sides ; flower-heads very shortly pedunculate, campanulate, 6–8 mm. long ; outer involucral bracts leafy, inner dry and chaffy ; outer flowers female, narrowly tubular, with a rudimentary ligule ; achenes slightly angular, glabrous, crowned with a minute setiform pappus .. .. .. .. .. *pratensis*

**C. pratensis** *Forsk.*—F.T.A. 3 : 305 ; Chev. Bot. 362. Erect branched half-woody hairy herb with dull yellow flowers in leafy-bracteate heads.

French Sudan : Djenné (in mud by a marsh, June) ! Senegal : Richard Tol (May) ! Gambia ! N. Nigeria Nupe ! Yola, in sandy bed of Benué R. (May) ! Extends to E. Sudan and Egypt. Exsicc.—*Döllinger*. *Barter* 1128. *Dalz.* 35. *Hayes* 548.

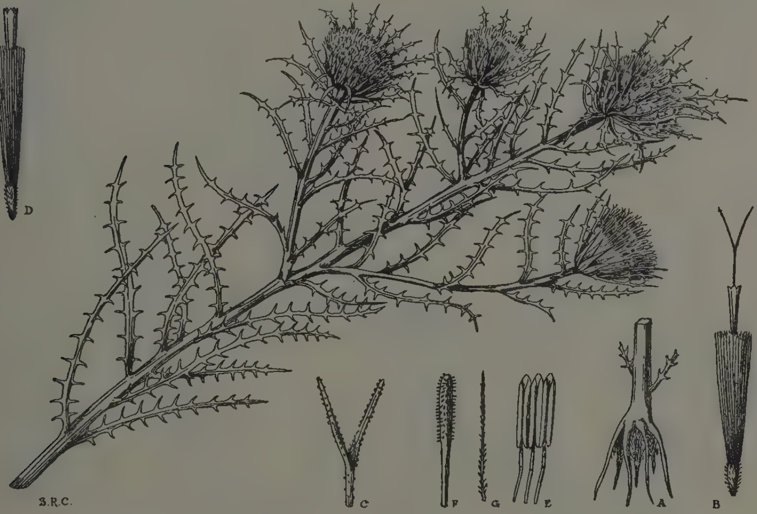

FIG. 222.—ADELOSTIGMA SENEGALENSE *Benth.* (COMPOSITAE).

A, roots. B, female flower. C, style-arms. D, hermaphrodite flower. E, anthers. F, style before opening. G, seta of pappus.

## 32. DICHROCEPHALA DC.—F.T.A. 3 : 302.

Flower-heads subsolitary or very few and racemose, subglobose, nearly 1 cm. diam. ; leaves broadly auriculate at the base, at most coarsely dentate or pinnately lobulate, scabrid-setulose on the upper surface, the lower ones up to about 10 cm. long and 3 cm. broad ; peduncles rather stout and long ; outer female flowers in several series, those of the disk hermaphrodite ; achenes flat, with a thick margin, glabrous, pappuso 1. *chrysanthemifolia*

Flower-heads rather numerous and paniculate, ovoid-globose, 3–4 mm. diam. ; leaves petiolate, not auriculate, pinnately partite, the terminal lobe more or less broadly ovate, serrate, setulose-pilose on both surfaces ; peduncles short and slender ; flowers and achenes as above but the latter smaller .. .. .. .. 2. *bicolor*

1. **D. chrysanthemifolia** *DC.*—F.T.A. 3 : 303. Erect herb 1–3 or 4 ft. high simple or branched above, slightly harsh-pubescent with spherical red-purple flower-heads.

Cameroons Mt., 7,000–9,000 ft. (Nov., Jan., Feb.) ! Fernando Po, summit of the Peak (Dec.) ! Widely spread in the tropics and subtropics. Exsicc.—*Mann* 606 ; 1267 ; 1927. *Dalz.* 8321.

2. **D. bicolor** *Schlechtend.* in Linnaea 25 : 209. *Cotula bicolor* Roth. *D. latifolia* DC.—F.T.A. 3 : 303 ; Chev. Bot. 361. Erect or ascending herb attaining 4–5 ft., branched, with angular roughly-pubescent stems and very small spherical purplish flower-heads.

French Guinea : Futa-Jallon, Ditinn ! Farana, Koulikoro ! Ivory Coast : Upper Sassandra, between Soucourala and Sanrou ! N. Nigeria : Bauchi Plateau, between Hepham and Ropp, 4,600 ft. (July) ! Cameroons Mt., 7,000–8,000 ft. (Nov., Jan.) ! Widely spread in the tropics and subtropics. Exsicc.—*Mann* 1268 ; 1926. *Lely* 368.

### 33. ANISOPAPPUS Hook. & Arn.—F.T.A. 3 : 369.

Pappus a single row of narrowly oblong jagged scales ; achenes prominently ribbed, thinly pubescent ; leaves narrowly triangular-lanceolate, truncate or subcordate at the base, 4–7 cm. long, 2–3 cm. broad, slightly scabrid above, puberulous below ; petiole up to 2 cm. long ; flower-heads few, corymbose ; involucral bracts about 3-seriate, up to 8 mm. long, scabrid ; receptacular scales oblanceolate, acutely acuminate ; ray-flowers conspicuous .. .. .. .. .. .. 1. *africanus*

Pappus a row of jagged scales with intermediate short bristles ; achene as above ; leaves oblong-lanceolate, subhastate at the base, 4–6 cm. long, 1–2 cm. broad, shortly setulose on both surfaces ; petiole at most 1 cm. long ; flower-heads very few, long-pedunculate ; involucral bracts oblong-oblanceolate, obtuse, 8 mm. long, grey-puberulous outside ; receptacular scales acutely acuminate ; ray-flowers rather inconspicuous .. .. .. .. .. .. .. .. .. 2. *Dalzielii*

1. **A. africanus** *Oliv. & Hiern*—F.T.A. 3 ; 369. Erect herbaceous 2–4 ft. high, with striate shortly-pubescent pithy stems, and yellow flower-heads $\frac{3}{4}$–1 in. across.

Cameroons Mt., 6,000–7,000 ft. or higher (Nov., Jan., Feb.) ! Exsicc.—*Mann* 1313 ; 1920. *Johnston* 25. *Dalz.* 8317. *Dunlap* 202. *Kalbreyer* 129. *Lehmbach* 652. *Mildbr.* 10827. *Maitland* 263. *Migeod* 213 ; 453.

2. **A. Dalzielii** *Hutch.* in Kew Bull. 1931 : ined. *A. africanus* Chev. Bot. 368, not of Oliv. & Hiern. *A. chinensis* A. Chev. Bot. 368, not of Hook. & Arn. Habit of the preceding ; flowers $\frac{1}{2}$–$\frac{2}{3}$ in. across.

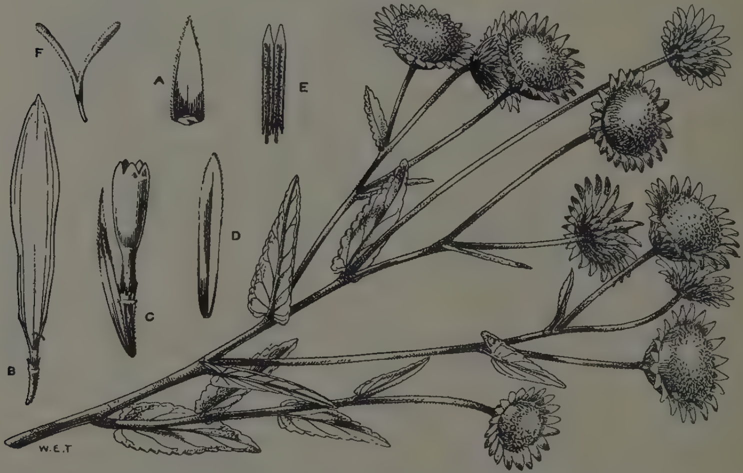

FIG. 223.—ANISOPAPPUS AFRICANUS *Oliv. & Hiern* (COMPOSITAE).

A, outer involucral bract. B, ray-flower. C, disk-flower and palea. D, involucral bract. E, anthers. F, style-arms.

French Sudan : Tabacco (Oct.) ! French Guinea Futa-Jallon, several localities (Sept., Oct.) ! Kouria and district (Nov., Dec.) ! Grandes Chutes (Dec.) ! Guerzé country, Nzo (Mar.) ! N. Nigeria : Kontagora (Oct.) ! Exsicc.—*Dalz.* 196. *Chev.* 2075 ; 14821 ; 14876 ; 18453 ; 18512 ; 18610 ; 20184 ; 20300 ; 21054

### 34. PULICARIA Gaertn.—F.T.A. 3 : 363.

Pappus double, outer shorter, cupular, toothed, inner of about 9–12 slender barbellate ; bristles slightly thicker towards the apex :

Whole plant densely woolly with white hairs ; leaves crowded, oblong-oblanceolate, coarsely toothed, 4–5 cm. long, up to 1·5 cm. broad ; flower-heads few, about 1·5 cm. diam. ; involucral bracts 2–3-seriate, linear, the outer woolly-pubescent, the inner glabrous ; achenes slightly pubescent .. .. .. .. .. 1. *undulata*

Whole plant at most thinly pilose ; leaves scattered, oblanceolate, minutely denticulate, up to 10 cm. long and 1·5 cm. broad, gland-dotted ; involucral bracts pilose ; achenes thinly pilose .. .. .. .. .. .. .. 2. *inuloides*

Pappus single, of slender barbellate bristles, white ; whole plant rather thinly woolly ; leaves oblong-oblanceolate, rounded at the apex, about 4 cm. long, up to 1·5 cm. broad, those on the flowering branchlets much smaller, closely woolly ; flower-heads rather numerous, long-pedunculate ; involucral bracts about 4–5-seriate, linear, with subulate points ; achenes glabrous .. .. .. .. .. .. 3. *crispa*

1. **P. undulata** *DC.*—F.T.A. 3 : 365. White-woolly herb, erect, branched, from a few inches to 2 ft. high, woody below, with yellowish subhemispherical flower-heads $\frac{1}{3}$–$\frac{2}{3}$ in. in diameter ; in fields, etc.

French Sudan : Central Sahara, 10 miles north of Abelessa (Mar.) ! Tamanrasset, 4,320 ft. (Mar.) ! Senegal. N. Nigeria : Sokoto (Nov., Dec.) ! Katagum, near Kaddera (Jan.) ! Yola (Jan.) ! Arege, at Lake Chad (Dec.) ! Extends through the Sudan to Egypt, Palestine and Arabia. Exsicc.—*Elliott* 152. *Dalz.* 34 ; 314. *Moiser* 186 ; 214 ; 230 ; 238. *Chipp* 25 ; 41.

2. **P. inuloides** *DC.* Prodr. 5 : 480. A yellow-flowered strongly scented herb ; sometimes stunted and only a few inches high.

French Sudan : Central Sahara, Silet, 2,500 ft., bank of irrigation ditch (Mar.) ! Extends to North Africa and Arabia. Exsicc.—*Chipp* 71.

3. **P. crispa** *Benth. & Hook. f.*—F.T.A. 3 : 366 ; Holl. 3 : 384 ; Chev. Bot. 366. Hoary white herb 1–2 ft. high branched, woody below, with pale yellow hemispherical flower-heads $\frac{1}{2}$ in. in diameter.

Mauritania and Senegal to N. Nigeria ! Across to Abyssinia and Upper Nile land ; also in Cape Verde Islands, Egypt, Arabia, India, etc. Exsicc.—*Roger* 35 ; 139. *Barter* 798. *Dalz.* 172 ; 201. *Lely* P. 81 ; 131 ; 630. *Chipp* 40 ; 102. (See Appendix).

## 35. **INULA** Linn.—F.T.A. 3 : 357.

Stems closely ribbed, becoming nearly glabrous ; radical leaves broadly elongate lanceolate, petiolate, irregularly denticulate, up to about 60 cm. long and 18 cm. broad ; stem-leaves sessile, ovate-lanceolate to lanceolate, mucronate, auriculate at the base, up to about 25 cm. long and 8 cm. broad, pilose-pustulate above, woolly below, denticulate ; flower-heads very numerous, small, crowded into corymbs ; peduncles slender, 1 cm. long ; involucral bracts about 4-seriate, lanceolate, pubescent, up to 1 cm. long ; achenes glabrous ; pappus white .. .. 1. *Mannii*

Stems densely clothed with silky hairs ; radical leaves elliptic-lanceolate, petiolate, about 15 cm. long and 6 cm. broad, densely scabrid above ; stem-leaves ovate to ovate-lanceolate, sessile, rounded at the base, up to 12 cm. long and 5 cm. broad, densely shaggy-villous below, dentate ; flower-heads few, large, up to 5 cm. diam. ; involucral bracts 6–7-seriate, densely silky .. .. .. .. .. 2. *Klingii*

1. **I. Mannii** *Benth.*—F.T.A. 3 : 358. A stout but soft-stemmed herb 2–10 ft. high, with rather large leaves pale-tomentose below and campanulate flower-heads $\frac{1}{3}$ in. long in dense corymbs.

Cameroons Mt., about 7,000 ft. (Dec.) ! Exsicc.—*Mann* 1314 ; 1933. *Maitland* 975 ; 1004.

2. **I. Klingii** *O. Hoffm.* in Engl. Bot. Jahrb. 24 : 472.

Togo : Bismarckburg ! Also in the Congo and Angola. Exsicc.—*Kling* 153.

## 36. **VICOA** Cass.—F.T.A. 3 : 361.

Stems slightly pubescent, brownish when dry ; leaves linear-lanceolate, sessile, auriculate at the base, acute, 5–8 cm. long, 0·8–1·5 cm. broad, denticulate, scabrid on both surfaces ; flower-heads few at the ends of long branches ; peduncles slender ; involucral bracts 3–4-seriate, linear, acute, up to 7 mm. long, glandular outside ; flowers all tubular ; achenes very small, pubescent ; pappus-bristles few, almost smooth, white *auriculata*

**V. auriculata** *Cass.*—F.T.A. 3 : 362. *Inula indica* A. Chev. Bot. 366. An erect slender-stemmed branched annual 1–3 ft. high, with sulphur-yellow flower-heads $\frac{1}{3}$–$\frac{1}{2}$ in. in diameter ; a field weed.

Senegal : Thies ! Gambia : common in fields ! French Guinea : Farana to Tindo ! Sierra Leone : Erimakuna, Niger Basin, in waste ground (Mar.) ! Dahomey : Zagnanado ! Gold Coast : Achimota (June) ! N. Nigeria : various localities, in fields ! S. Nigeria : Lagos Colony ! Ogurude (Jan.) ! Extends through the Sudan to India ; also in S. Trop. Africa. Exsicc.—*Boteler*. *Brown-Lester* 21. *Sc.Elliot* 5253. *Barter* 855. *Rowland*. *Chev.* 2033 ; 20476 ; 22994

## 37. **PLUCHEA** Cass.—F.T.A. 3 : 327.

Branchlets softly appressed-pubescent ; leaves sessile, oblong or oblong-obovate, auriculate at the base, rounded at the apex, 4–6 cm. long, 1·5–3 cm. broad, rather densely scabrid-pubescent, repand-dentate ; flower-heads several in a terminal corymb ; involucral bracts about 5-seriate, ovate-lanceolate, thinly pubescent, straw-coloured ; achenes slightly pubescent .. .. .. .. 1. *ovalis*

Branchlets softly tomentellous ; leaves sessile, lanceolate, entire or slightly denticulate, 4–5 cm. long, prominently nerved, finely puberulous ; flower-heads crowded in a corymb, shortly pedunculate ; involucral bracts about 5-seriate, ovate-rounded, pubescent ; achenes glabrous .. .. .. .. .. 2. *lanceolata*

1. **P. ovalis** *DC.*—F.T.A. 3 : 328. *Pluchea Dioscoridis* A. Chev. Bot. 365, not of DC. Shrubby with pale-pubescent striate stems and numerous rather small whitish flower-heads $\frac{1}{4}$ in. broad.

French Sudan : Cotaga, on the Niger ! Timbuktu (July) ! Senegal : Mbidjem, etc. ! Togo : Lome ! Also in Cape Verde Islands, Atlantic Islands, Angola, Uganda and in N.W. India. Exsicc.—*Brunner* 77. *Sieber* 61. *Warnecke* 223 ; 312. *Chev.* 1159 ; 1204 ; 2037.

2. **P. lanceolata** *Oliv. & Hiern*—F.T.A. 3 : 329. A small shrub covered with a fine grey indumentum, with small pink flower-heads.

Senegal. Also in N.W. India. Exsicc.—*Perrottet*.

**P. odorata** *Cass.* (*P. senegalensis* Klatt) is recorded from Senegal, collected by *Perrottet* and *Lelièvre*. We have not seen specimens, and it was probably a chance introduction from tropical America.

## 38. **BLUMEA** DC.—F.T.A. 3 : 322.

Stems ribbed, pubescent ; leaves narrowly obovate, gradually narrowed to the base, 4–7 cm. long, 2–3 cm. broad, irregularly dentate, softly tomentose below ; flower-heads very numerous and forming an oblong spike-like inflorescence ; involucral bracts densely pilose, about 5 mm. long ; achenes glabrous ; pappus-setae white, about 12 to each achene .. .. .. .. .. .. .. 1. *lacera*

Stems slightly ribbed, pubescent ; leaves oblong to narrowly oblong-obovate, auriculate at the base, the lower ones about 6 cm. long and 3 cm. broad, those on the ultimate branchlets much smaller sessile and pinnately lobed or coarsely toothed, thinly pilose below ; flower-heads more or less corymbose, pedunculate ; involucral bracts as above ; achenes slightly pubescent ; pappus white .. .. .. 2. *aurita*

1. **B. lacera** *DC.*—F.T.A. 3 : 322 ; Stapf 615 Holl. 3 : 383 ; Chev. Bot. 364. A strong-scented pale-hairy weed 1–3 or more ft. high, with coarsely toothed leaves and numerous purple flower-heads ¼–⅓ in. in diameter.
French Sudan : Tabacco. Senegal : Casamance, etc. ! Gambia ! French Guinea : Kindia. Sierra Leone : Scarcies, Kofiu and Laya (Jan.) ! Limba, Kafogo (Apr.) ! Liberia : Kakatown ! Gold Coast : Achimota (June) ! Togo ! N. Nigeria : Nupe ! Sokoto, marshy places (July, Nov.) ! Bauchi Plateau, in farm land (Jan.) ! A weed of the Old World tropics. Exsicc.—*Heudelot* 677 bis. *Barter* 1164. *Sc. Elliot* 4484 ; 4617 ; 5482. *Whyte.* *Dalz.* 404. *Lely* P. 76 ; P. 123.
2. **B. aurita** *DC.*—F.T.A. 3 : 322 ; Chev. Bot. 364. A herb with the habit of the last, strongly-scented, with yellowish or pale mauve flowers ; in waste places and farms.
French Sudan : Bamako (Jan.) ! Gambia ! French Guinea : Kouroussa (Dec.) ! Sierra Leone : Sasseni (Jan.) ! Kambia (Dec.) ! Gold Coast : Achimota (June) ! Togo : Lome ! Dahomey : Atacora Mts., Somba country. N. Nigeria : Nupe ! Sokoto (Dec.) ! Bauchi Plateau (Jan.) ! S. Nigeria : Lagos Colony ! Awka ! A weed of the Old World tropics. Exsicc.—*G. Don.* *Baikie.* *Sc. Elliot* 4395. *Rowland.* *Dalz.* 413. *Lely* P. 138. *Pobéguin* 609. *Warnecke* 274. (See Appendix).

## 39. **PORPHYROSTEMMA** Grant—F.T.A. 3 : 367.

A herb ; stems appressed-pilose ; leaves sessile, linear, about 10 cm. long and 6 mm. broad, nearly glabrous ; flower-heads corymbose, few, shortly pedunculate, about 2 cm. diam. ; peduncle villous ; involucral bracts numerous, about 4-seriate, linear, very acute, up to 1·5 cm. long, shortly pilose ; corolla-limb pubescent ; achenes thinly pubescent ; pappus-bristles about 15, uniform, barbellate.

**P. Chevalieri** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *P. Grantii* var. *Chevalieri* O. Hoffm. Chev. Bot. 367. Erect, branched, 12–18 in. high, with solitary flower-heads terminal on the branches, ¾–1½ n. across.
Senegal : Casamance ; Sinédone (Jan.) ! Exsicc.—*Chev.* 2091.

## 40. **PEGOLETTIA** Cass.—F.T.A. 3 : 360.

Stems pubescent, ribbed ; leaves linear, 1·5–2 cm. long, entire or slightly toothed, densely scabrid-setulose ; flower-heads numerous, laxly subcorymbose, about 1 cm. diam. ; involucral bracts 2-seriate, outer linear, inner lanceolate, 1 cm. long, pubescent ; flowers all tubular ; achenes closely ribbed, thinly pubescent, 5 mm. long ; pappus 2-seriate, the outer short, multifid, the inner longer, plumose .. *senegalensis*

**P. senegalensis** *Cass.*—F.T.A. 3 : 361. A branched annual or biennial woody below, slightly glandular and odorous, with yellow or purplish campanulate flower-heads ½ in. long.
Senegal : in sandy soil, Sor Island, etc. ! N. Nigeria : Kuka (Feb.) ! Also in Cape Verde Islands, to E. Sudan, Arabia and W. India, and in S. Trop. Africa and N. Transvaal. Exsicc.—*Roger* 86. *Brunner* 187. *E. Vogel* 60.

## 41. **LAGGERA** Sch. Bip.—F.T.A. 3 : 323.

Stem-wings cut up into jagged teeth or lobules ; leaves oblong-obovate, dentate, up to 12 cm. long and 4·5 cm. broad, finely puberulous on both surfaces ; flower-heads numerous in a leafly panicle ; peduncles slender ; involucral bracts about 6-seriate, greenish, puberulous, up to 1 cm. long ; achenes pubescent ; pappus-bristles slender, white, minutely barbellate .. .. .. .. .. .. 1. *pterodonta*

Stem-wings entire, very narrow ; leaves linear-oblong, up to 20 cm. long and 3·5 cm. broad, scabrid-pubescent on both surfaces, denticulate ; involucral bracts scabrid ; achenes shortly pubescent ; pappus as above .. .. .. .. 2. *alata*

Stem-wings broad, subentire ; leaves oblanceolate to oblong-oblanceolate, subacute, long-decurrent on the stem, scabrid-pubescent, up to 15 cm. long and 5 cm. broad, denticulate ; involucra lbracts slightly scabrid ; achenes shortly pubescent 3. *oblonga*

1. **L. pterodonta** *Sch. Bip.*—F.T.A. 3 : 324 ; Chev. Bot. 365. A rather stout branched herb, woody below, sometimes several feet high, slightly glandular-pubescent, viscid and odorous, with broadly campanulate purple flower-heads ¼–½ in. or more in diameter.
Senegal : Casamance, Sinédone ! Sierra Leone : Scarcies R., Wallia (Jan.) ! Togo : Kpedsu (Jan.) ! N. Nigeria : Bauchi Plateau, Naraguta (Nov.) ! Vom, 3,000–4,500 ft. ! Extends to Abyssinia and Upper Nile land, also India, Madagascar, etc. Exsicc.—*Sc. Elliot* 4458. *Howes* 1123. *Lely* 708. *Dent Young* 149.
2. **L. alata** *Sch. Bip.*—F.T.A. 3 : 326 ; Chev. Bot. 364. Robust erect branched herb pubescent and slightly glandular, with winged stems 1–6 ft. high and red or purple flower-heads ¾ in. in diameter when open forming panicles.
Senegal to Cameroons ! Cameroons Mt. : Buea ! and upper grassland, 7,000–8,000 ft. ! Throughout tropical Africa. Exsicc.—*Heudelot* 639. *Barter* 1287. *Sc. Elliot* 3971 ; 4044. *Mann* 1269 ; 1914. *Rowland.* *Brown* 933. *Dawodu* 178. *Lely* 693. *Dunlap* 160 ; 196. *Maitland* 126. (See Appendix).
3. **L. oblonga** *Oliv. & Hiern*—F.T.A. 3 : 327. *L. macrorrhiza* O. Hoffm. & Muschler—Chev. Bot. 365. Erect, branched, from a few inches high to 2 ft. or more, from a woody stock, with white flower-heads 1 in. in diameter when open, at the ends of short lateral branchlets.
French Sudan : Medinani (Feb.) ! Sierra Leone : Buyabuya, Scarcies (Feb.) ! N. Nigeria : Kontagora (Nov.) ! Zaria, near Ringa (Feb.) ! Abinsi (Oct.) ! Bauchi Plateau, Naraguta (Feb.) ! Also in Upper Shari and Congo Basin. Exsicc.—*Sc. Elliot* 4545. *Dalz.* 205 ; 422 ; 666. *Lely* 54 ; P. 162. *Chev.* 504.

## 42. **ACHYROCLINE** Less.—F.T.A. 3 : 339.

A lanky herb ; stems narrowly winged, pubescent ; leaves linear to linear-oblanceolate, acute, up to 10 cm. long and 1·5 cm. broad, entire, distinctly 3-nerved, scabrid above, woolly-pubescent below; flower-heads very small, crowded into broad woolly corymbs; involucral bracts golden and shining, membranous, glabrous except at the base; achenes ellipsoid, slightly glandular; pappus white .. 1. *Hochstetteri*

A herb; stems not winged, woolly-tomentose; leaves linear-oblanceolate, curved at the apex, about 2 cm. long, closely woolly on both surfaces; flower-heads few, silvery or dull yellowish; involucral bracts glabrous .. .. .. 2. *glumacea*

1. **A. Hochstetteri** *Sch. Bip.*—F.T.A. 3 : 339. Erect, 1½–4 or 5 ft. high, branched from the base and woody below, thin white-woolly, with very numerous small golden-yellow oblong flower-heads in abundant corymbs.
Cameroons Mt., grassland 7,000–8,000 ft. (Dec., Jan., Feb.) ! Fernando Po, 8,500 ft. (Dec.) ! Also in E Africa from Abyssinia to N. Transvaal. Exsicc.—*Mann* 607; 1228; 1934. *Dunlap* 197. *Dalz.* 8323. *Migeod* 331. *Maitland* 922; 970.

2. **A. glumacea** *Oliv. & Hiern* ?—F.T.A. 3 : 340. *A. luzuloides* A. Chev. Bot. 366, not of Vatke. Tufted, much-branched, woody below, 6–10 in. high, grey-pubescent all over.
Senegal: Dakar ! Niayes ! Also in N.E. Trop. Africa. Exsicc.—*Perrottet*. *Chev.* 2045; 2049. Possibly a distinct species, but the material is not sufficient to decide the question.

## 43. HELICHRYSUM Gaertn.—F.T.A. 3 : 345; Moeser in Engl. Bot. Jahrb. 44 : 239.

Leafy at the time of flowering.

Leaves ericoid, imbricate, linear to linear-lanceolate, about 2 cm. long, 3–4 mm. broad, margins much recurved, densely woolly-tomentose on both surfaces; flower-heads very small, densely crowded into subglobose clusters; involucral bracts brownish, membranous, with frayed margins.. .. .. .. .. 1. *fruticosum*

Leaves not ericoid, more or less lanceolate:

Involucral bracts white, broadly ovate, subacute; flower-heads 1·5–2 cm. diam. across the disk; leaves lanceolate to subovate-lanceolate, acutely acuminate, scabrid (not woolly) above, woolly-tomentose below, up to 12 cm. long and 3 cm. broad.. .. .. .. .. .. .. .. .. .. 2. *Mannii*

Involucral bracts lemon-yellow or brown:

Flower-heads about 2 cm. diam. across the disk; leaves ovate-lanceolate, broadly subauriculate at the base, 6–12 cm. long, 2·5–4 cm. broad, densely woolly-tomentose on both surfaces; involucral bracts narrowly linear-lanceolate, acute 3. *cameroonense*

Flower-heads up to 1 cm. diam. across the disk:

Flower-heads about 1·5 cm. diam. (incl. the bracts), forming an open corymb; involucral bracts broadly lanceolate, acute; leaves narrowly lanceolate, acutely acuminate, sessile, auriculate at the base, 6–12 cm. long, 1–2 cm. broad, glabrescent above, rather thinly woolly below .. .. .. .. 4. *foetidum*

Flower-heads about 6–7 mm. diam. (incl. the bracts), numerous, corymbose; leaves linear-lanceolate, about 9 cm. long and 1 cm. broad, slightly woolly above, more densely so below .. .. .. .. .. .. 5. *biafranum*

Flower-heads 2–3 mm. diam., in a dense terminal cluster; involucral bracts brownish, glabrous; lower leaves very long-petiolate, broadly lanceolate, acutely acuminate, the blade about 7–10 cm. long and 2·5 cm. broad, slightly scabrid above, thinly woolly-tomentose below, with 3 prominent parallel lateral nerves 6. *globosum*

Leafless at flowering time, except for two or three reduced leaves on the densely woolly stems, the latter from a rhizome; flower-heads several in a terminal cluster; involucral bracts oblong-elliptic, tinged with reddish brown .. 7. *Mechowianum*

1. **Helichrysum fruticosum** *Vatke* in Linnaea 39 : 491; Moeser in Engl. Bot. Jahrb. 44 : 257. *H. cymosum* Oliv. & Hiern—F.T.A. 3 : 353, not of Less. Erect woody plant much branched from the base, 1–2 ft. or up to 4 ft. high, thinly white-woolly, with very numerous small golden-yellow flower-heads.
Cameroons Mt., grasslands up to 10,000 or 11,000 ft. (Jan., Feb., Mar.) ! Fernando Po, up to the summit ! Also on the mountains of East and Central Africa and in the Mascarene Islands. Exsicc.—*Mann* 284 (partly); 1287; 1930. *Johnston* 16. *Dalz.* 8322. *Mildbr.* 10835; 10847. *Migeod* 156; 341; 442. *Maitland* 945; 1000.

2. **H. Mannii** *Hook. f.* in Journ. Linn. Soc. 6 : 12. A stout herb 1–2 ft. high, with pithy stem, crowded sessile half-amplexicaul leaves, and numerous pale cream-whitish flower-heads ¾ in. in diameter.
Cameroons Mt., grasslands, 8,000 ft. up to the summit and in the crater lip (Dec., Jan.) ! Fernando Po, summit (Dec.) ! Exsicc.—*Mann* 615; 1244; 1937. *Johnston* 51. *Miss Kingsley*. *Mildbraed* 10920.

3. **H. cameroonense** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *H. foetidum* Oliv. & Hiern—F.T.A. 3 : 352, partly. *H. foetidum* var. *giganteum* Moes. Habit of the last, 2–4 ft. high, with lemon-yellow flower-heads ¾ to nearly 1 in. in diameter.
Cameroons Mt. grasslands, up to about 11,000 ft. (Dec., Jan., Feb.) ! Exsicc.—*Mann* 1306; 1932. *Dalz.* 8307. *Maitland* 986. *Mildbr.* 10852.

4. **H. foetidum** *Cass.*—F.T.A. 3 : 352, partly. Erect, slightly branched plant with pithy stem, 1–4 or 5 ft. high, with comparatively narrow leaves white below, and bright yellow flower-heads ¾ in. across.
S. Nigeria: Calabar ! Cameroons Mt., grasslands, 5,000 to over 9,000 ft. (Dec., Jan., Feb.) ! Fernando Po, to summit ! On the mountains of tropical Africa generally. Exsicc.—*Mann* 281; 1916. *Dunlap* 194. *Dalz.* 8308. *Hewan*. *Kalbreyer* 128. *Maitland* 251; 969. *Migeod* 336.

5. **H. biafranum** *Hook. f.*—F.T.A. 3 : 351. A tall erect slender herb up to 10 ft. high, with narrowly-winged stem and numerous small bright yellow flower-heads about ¼ in. in diameter.
Cameroons Mt., 7,000 ft. ! In ravine in grassland above Buea 7,000–9,000 ft. Exsicc.—*Mann* 1934 (partly).

6. **H. globosum** *Sch. Bip.*—F.T.A. 3 : 354. Stems slender 6 in. to 2 ft. or more high from a hard base, white-woolly, with small oblong golden or brownish-yellow flower-heads ¼ in. or less long.
Cameroons Mt., grasslands, up to 9,000 or nearly 10,000 ft. (Nov.) ! Fernando Po, to summit ! Also in Abyssinia and E. Sudan; south to Zambesi and Angola. Exsicc.—*Mann* 284 (partly); 1912. *Johnston* 22. *Miss Kingsley*. *Maitland* 482. *Migeod* 294.

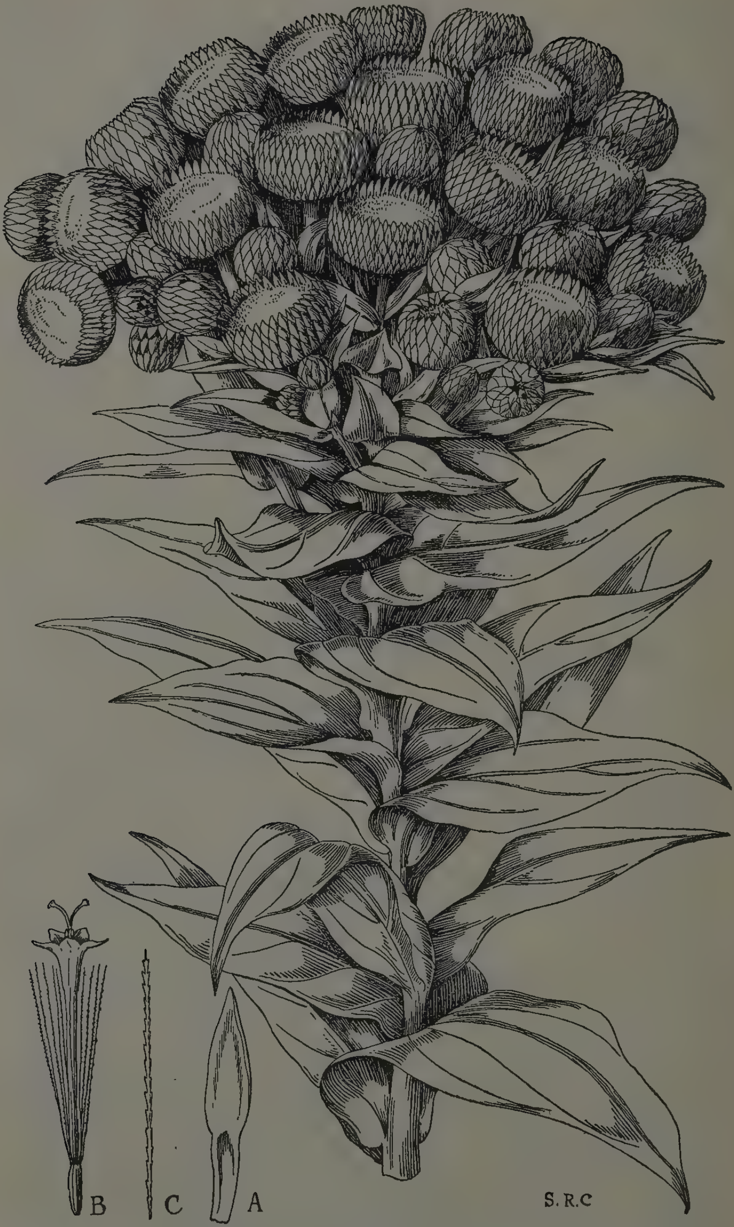

FIG. 224.—HELICHRYSUM CAMEROONENSE *Hutch. & J. M. Dalz.* (COMPOSITAE). A, involucral bract. B, flower. C, pappus-bristle. (Adapted from Fitch's drawing.)

7. **H. Mechowianum** *Klatt* in Ann. Nat. Hofmus. Wien 7 : 101. *H. Hoepfnerianum* Vatke. *H. congolanum* Schltr. Stems simple 3–8 in. high from a woody base, with rich yellow oblong flower-heads $\frac{1}{3}$ in. long.
Togo : Agome (Mar.) ! N. Nigeria : Bauchi Plateau, Vom, etc., 3,000–4,500 ft. appearing after grass burning (Jan.) ! Extends to Angola. Exsicc.—*Hill* 11. *Dent Young* 151. *Lely* P. 21. *Schlechter* 12960.

### 44. GNAPHALIUM Linn.—F.T.A. 3 : 341.

Flower-heads glomerate-cymose ; lower leaves spathulate, woolly on both surfaces, without visible nerves, up to 8 cm. long and 1·5 cm. broad, upper leaves linear ; involucral bracts silvery white, shining, the outermost white-woolly .. 1. *luteo-album*
Flower-heads subspicate ; lower leaves spathulate-oblanceolate, mucronate, 3–4 cm. long, about 1 cm. broad, very thin, woolly-tomentose especially below ; involucral bracts woolly .. .. .. .. .. .. .. .. .. 2. *niliacum*

1. **G. luteo-album** *Linn.*—F.T.A. 3 : 343 ; Chev. Bot. 366. Herbaceous with a hard base, erect up to 12–18 in. high or decumbent, white-cottony with clustered small golden-silky flower-heads.
French Sudan : Dioubéba, by the Senegal R. (Feb.). Senegal. French Guinea : between the Kaba and the Upper Mamou (May). N. Nigeria : Sokoto, fairly common (Jan., Feb.) ! Bauchi Plateau, 3,000–4,500 ft., several localities (Jan., May) ! S. Nigeria : Abo ! Cameroons Mt. : Buea, Signal Hill (Feb.) ! In tropics and subtropics generally. Exsicc.—*Barter* 194. *Dalz.* 408 ; 409 ; 410 ; 8229. *Lely* P. 67 ; 84 ; 107. *Dent Young* 150.
2. **G. niliacum** *Raddi*—F.T.A. 3 : 344. *G. indicum* A. Chev. Bot. 366, not of Linn. A diffuse branched herb a few inches high, thinly cottony, with small golden-silky flower-heads closely crowded in spike-like clusters.

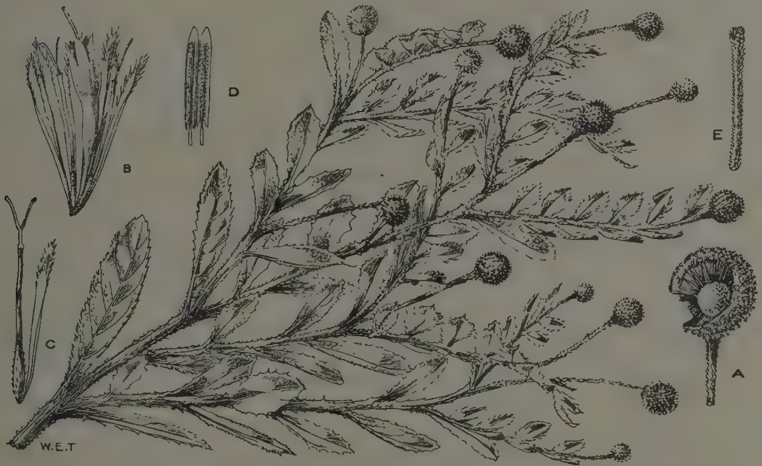

FIG. 225.—SPHAERANTHUS SENEGALENSIS *DC.* (COMPOSITAE).
A, portion of compound head. B, partial head. C, female flower. D, anthers. E, style.

French Sudan : Langana, by the Niger ! Senegal R. ! Casamance, Floup-Fedyan (Jan.) ! Also in Egypt and E. Sudan. Exsicc.—*Perrottet*. *Chev.* 264 ; 265 ; 2031.

### 45. SPHAERANTHUS Vaill.—F.T.A. 3 : 332 ; Robyns in Kew Bull. 1924 : 177.

Stems winged :
Common involucre conspicuous, campanulate ; bracts obovate, sharply acuminate, about 7 mm. long, pubescent ; leaves linear, 3–4 cm. long, minutely glandular-scabrid ; heads depressed-globose, nearly 1 cm. diam. .. .. .. 1. *nubicus*
Common involucre not visible ; leaves linear to oblong-oblanceolate, subulate-mucronate, decurrent on the stem, up to 10 cm. long and 1·8 cm. broad, lanate, with sharply subulate teeth ; heads globose, about 1 cm. diam. ; peduncle narrowly winged, 2–4 cm. long .. .. .. .. .. .. 2. *senegalensis*
Stems not winged ; common involucre not visible ; leaves oblong, auriculate, subentire, densely pilose, up to about 2·5 cm. long and 1 cm. broad ; heads globose, about 1 cm. diam. ; peduncle slender, not winged, 1–1·5 cm. long .. .. .. 3. *Brounae*

1. **Sphaeranthus nubicus** *Sch. Bip.*—F.T.A. 3 : 335 ; Robyns l.c. 193. *S. Lelyi* Robyns. A glandular pubescent herb, erect 1–2 ft. high or diffuse, branching, with yellowish hemispherical flower-heads $\frac{1}{3}$ in. in diameter.
N. Nigeria : Kuka, common near Lake Chad (Feb.) ! Sokoto ! Also in E. Sudan. Exsicc.—*E. Vogel* 39. *Lely* 149.
2. **S. senegalensis** *DC.* Prodr. 5 : 370 ; Robyns l.c. 197. *S. hirtus* Oliv. & Hiern—F.T.A. 3 : 334, not of Willd. ; Holl. 3 : 384 ; Chev. Bot. 365. *S. Lecomteanus* O. Hoffm. & Muschler—Chev. Bot. 365. Erect branching 1–3 ft. high or half-decumbent, softly whitish hairy, with red-purple spherical flower-heads $\frac{1}{3}$ in. in diameter.

French Sudan: near San! Senegal: several localities! Gambia: common! Sierra Leone. N. Nigeria: Kontagora, etc., a weed in fields and in the bush (Nov.)! Also in Mauritania, Rhodesia, and in India and Indo-China. Exsicc.—*Roger*. *Brunner* 113. *Heudelot* 771. *Brown-Lester* 2; 8. *Ozanne* 6. *Farmar* 130. *Dalz.* 189. *Chev.* 1042; 2076; 2077; 1086 bis; 15804. (See Appendix).

3. **S. Brounae** *Robyns* l.c. 198. A much-branched softly tomentose herb with flower-heads like the last.
N. Nigeria: Bauchi Plateau, on farms (Jan.)! Also in E. Sudan. Exsicc.—*Lely* P. 136.

## 46. AMBROSIA Linn.—F.T.A. 3 : 370.

Stems pilose with whitish hairs; leaves petiolate, deeply bipinnately divided, segments lobulate, up to about 12 cm. long, softly pubescent; flower-heads unisexual, males in a terminal raceme, females axillary, clustered; male involucre cup-shaped, about 5 mm. diam.; bracts united into a lobed involucre; male flowers with a corolla; female heads 1-flowered; female flower without a corolla; achene obovoid, enclosed in the 4-6-horned involucre, smooth, without a pappus .. .. .. *maritima*

**A. maritima** *Linn.*—F.T.A. 3 : 370. *A. senegalensis* DC.—F.T.A. 3 : 371; Chev. Bot. 368. Erect branched 1–3 ft. high woody below, sometimes almost shrubby, with striate stems, more or less hoary; flower-heads small greenish yellow forming rather dense spikes.
French Sudan: common! Senegal! N. Nigeria: Borgu, in fields, Sokoto (Nov., Dec.)! Katagum! Kuka (Apr.)! Distributed in the Mediterranean region, E. Tropical and S. Africa and Mascarene Islands. Exsicc.—*Perrottet*. *E. Vogel* 87. *Barter* 837; 191. *Dalz.* 325. *Moiser* 205; 244. *Chev.* 1114. (See Appendix).

## 47. AEDESIA O. Hoffm. in Engl. & Pranth Planzenf. Nachtr. 1 : 321 (1897), and in Engl. Bot. Jahrb. 24 : 467; Mattfeld l.c. 59 : Beibl. 133 : 8 (1924).

Leaves lanceolate, rather abruptly acute (not elongated), broad at the base, about 15 cm. long and 2·5 cm. broad at the base, serrulate, glabrous, with about 15 pairs of lateral nerves; flower-head about 5 cm. diam., solitary, densely surrounded by the upper leaves, sessile; involucral bracts subuniseriate, linear-spathulate, 3–4 cm. long, glabrous; achenes ribbed, pubescent; pappus fuscous, 2·5–3 cm. long 1. *glabra*

Leaves very similar to above but much narrower and elongated to a very narrow apex, and flower-heads about 3 cm. diam.; probably only a form of preceding 2. *Baumannii*

1. **A. glabra** *O. Hoffm.* in Engl. Bot. Jahrb. 24 : 468; Mattfeld l.c. 10; Chev. Bot. 381. *A. latifolia* A. Chev. Bot. 381. *Bojeria glabra* Klatt. Perennial, erect, simple, 1–2 ft. high, with a stout knotted rootstock, long narrow leaves and a terminal purple flower-head; habitat in damp places in grass savannah.
Senegal: Casamance, near Sedhiou. French Guinea: Farana, Kouria, etc. (Jan., July, Aug.)! Sierra Leone: Talla Plateau, Mt. Gonkwi (Febr.)! Kaballa (Sept.)! Kurafoni (Febr.)! Bumban (Aug.)! Ivory Coast: Mankono, Siana to Nandala (June)! Baoulé-Nord, Middle Nzi Valley, in marsh (Aug.)! N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft.! Also in Cameroons. Exsicc.—*Sc. Elliot* 4985. *N. W. Thomas* 2194. *Macdonald* 16. *Deighton* 1230. *Dent Young* 143. *Chev.* 21858; 22233.

2. **A. Baumannii** *O. Hoffm.* l.c.; Mattfeld l.c. 10; Chev. Bot. 380. Like the last; flowers purple or yellow.
French Sudan: Ouré! Ivory Coast: Baoulé-Nord, Nzi Valley, Sanguira (July)! Sassandra and Bafing Confluence, Dotou! Kouroukoro to Touna! Gold Coast: Yeji! Salaga! Togo: Nkonga (Nov.)! Kratschi; Agome. N. Nigeria: Borgu! Kilba, near Dua (July)! Bauchi Plateau, Naraguta (June)! S. Nigeria: Lagos Colony! Also in N. and S. Cameroons and Shari-Chad. Exsicc.—*Barter* 713. *Easmon*. *Dawodu* 174. *Dalz.* 28. *Anderson* 49. *Lely* 253. (See Appendix).

## 48. VERNONIA Schreb.—F.T.A. 3 : 266.

Flower-heads appearing before or separate from the leaves; stems from a rhizome or tuberous rootstock:

Involucral bracts 4–5-seriate, thinly woolly outside, up to 1·3 cm. long, rounded at the apex; leaves lanceolate, variable in size up to 15 cm. long and 6 cm. broad, serrulate, pustulate-scabrid above, densely tomentose below; pappus double, the outer bristles shorter, all flattened; achenes strongly ribbed, pubescent and glandular 1. *pumila*

Involucral bracts 2-seriate, slightly pubescent outside, purplish, linear-lanceolate, up to 1·5 cm. long; leaves [1] elongate-oblong-oblanceolate, up to 40 cm. long and 9 cm. broad, scabrid above, softly pubescent below, minutely denticulate, with numerous lateral nerves; peduncle about 1 cm. long, from a tuft of long silky hairs; achenes densely pubescent; pappus bristles not flattened .. .. 2. *chthonocephala*

Flower-heads accompanying the leaves; not very dwarf:

Innermost involucral bracts very long and tinged with purple, about twice as long as the pappus and achene, the outer ones spreading down the peduncle; stems woolly at the base; leaves obovate or obovate-oblanceolate, cuneate at the base, up to about 17 cm. long and 7 cm. broad, thick, denticulate, very scabrid on both surfaces; achenes densely tomentose; pappus yellowish .. .. 3. *nigritiana*

Innermost involucral bracts not very much larger than the others or the pappus, not purple:

Involucral bracts with a broad or narrow terminal appendage (the bracts appearing constricted in the middle):

Leaves woolly-tomentose below; involucral bracts pubescent or tomentose:

Involucral bracts thinly pubescent or nearly glabrous outside, lanceolate, acutely acuminate; leaves obovate to obovate-oblanceolate, up to 20 cm. long and 6 cm.

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[1] Leaves described from the Angolan specimens.

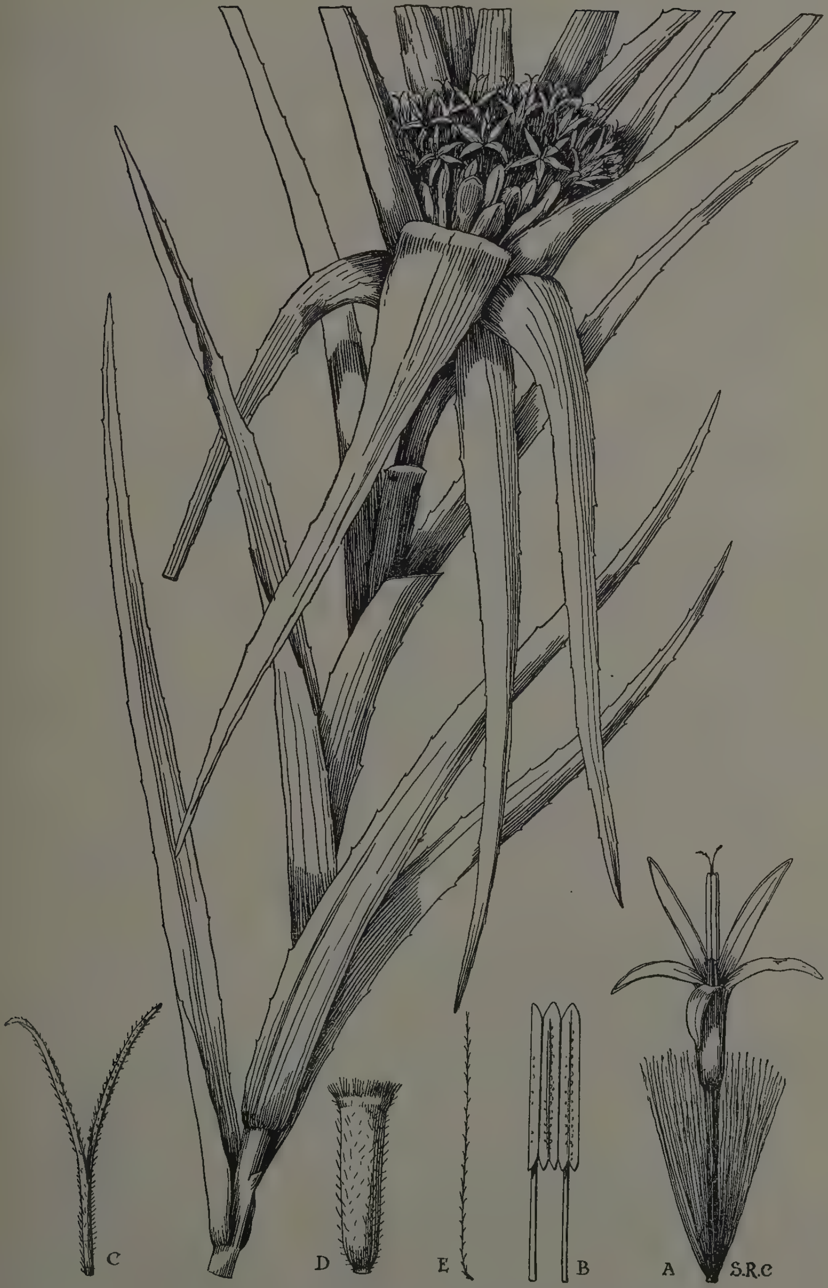

FIG. 226.—AEDESIA BAUMANNII *O. Hoffm.* (COMPOSITAE).
A, flower. B, anthers. C, style-arms. D, achene. E, pappus-bristle.

broad, sharply serrate, minutely scabrid above ; flower-heads widely campanulate, 3–4 cm. diam. ; achenes ribbed, pubescent ; pappus of long and shorter setae .. .. .. .. .. .. .. .. 4. *Tenoreana*

Involucral bracts softly tomentose outside, linear ; leaves as above but smaller and with rather irregularly dentate margins ; achenes as above, but pappus-bristles few, the outer series very short .. .. .. 5. *stenostegia*

Leaves glabrous or nearly so below ; involucral bracts glabrous :

Achenes pubescent on the ribs ; leaves coarsely toothed, oblong-oblanceolate, about 15 cm. long and up to 5 cm. broad, finely pubescent and minutely glandular below ; involucral bracts undulate, narrowly lanceolate in the upper part 6. *Kotschyana*

Achenes glabrous ; leaves shallowly dentate, shape as above, minutely pubescent below ; involucral bracts with broad ovate appendages, glabrous outside :

Leaves petiolate, without basal auricles .. .. .. .. 7. *insignis*

Leaves narrowed into a basal auricle .. .. .. .. .. 8. *Calvoana*

Involucral bracts without a terminal appendage :

Flower-heads with an outer involucre of broad leafy bracts (upper leaves) ; leaves scabrid on both surfaces, glandular-punctate below, linear-lanceolate to elliptic, acute, entire or nearly so, up to 18 cm. long and 4 cm. broad ; flower-heads usually solitary, sessile, widely campanulate, up to 2·5 cm. diam. ; involucral bracts sharply apiculate, pubescent ; achenes villous.. .. .. 9. *purpurea*

Flower-heads without leafy bracts around the base :

Flower-heads forming an elongated raceme-like narrow inflorescence ; involucre about 1 cm. long, bracts tomentose ; leaves oblong or elliptic, not acuminate, 5–15 cm. long, 2·5–6 cm. broad, scabrid above, woolly-tomentose below, nervose ; achenes pubescent ; pappus with a very short outer row of setae 10. *camporum*

Flower-heads corymbose or paniculate :

*Herbs, sometimes woody towards the base, but usually not over 1·5 m. high :

Flower-heads solitary or subsolitary, on long peduncles, large, about 3·5–4 cm. diam. ; involucral bracts about 4-seriate, narrowly oblong, long-apiculate, glabrous ; leaves oblong-obovate, rounded at the apex, up to 20 cm. long and 7 cm. broad, obscurely denticulate, glabrous ; achenes shortly pubescent 11. *primulina*

Flower-heads corymbose or paniculate :

Flower-heads elongated-cylindric, gradually tapered to the base, about 3–4 times as long as broad ; bracts woolly in the upper part ; leaves narrowly lanceolate, mucronate, 3–5 cm. long, up to 1 cm. broad, thinly pubescent on both sides ; achenes ribbed, pubescent .. .. .. 12. *oocephala*

Flower-heads more or less campanulate or turbinate :

Outermost involucral bracts linear-filiform, rather long ; achenes pubescent ; outer pappus not scale-like :

Outer bracts nearly as long as the intermediate ones, slender ; leaves narrowly lanceolate, distantly serrate .. .. .. 13. *pauciflora*

Outer bracts rather short ; leaves broadly oblanceolate to obovate, shortly dentate .. .. .. .. .. .. .. .. 14. *glabra*

Outermost involucral bracts not linear-filiform, rather short :

†Outer pappus of short scales or bristles broader than the inner bristles :

Leaves linear-acicular, with recurved margins, about 3 cm. long, scabrid-setulose ; flower-heads turbinate-campanulate, about 1·5 cm. long ; involucral bracts gradually increasing in size upwards, villous ; achenes pubescent on the ribs .. .. .. .. .. 15. *Perrottetii*

Leaves not acicular :

Flower-heads very acute or turbinate at the base :

Involucral bracts about 5-seriate ; heads 7–8 mm. long ; leaves linear or oblanceolate, 2–4 cm. long, gland-dotted below ; achenes pubescent 16. *elegantissima*

Involucral bracts 10–12-seriate ; heads about 2 cm. long, the bracts spreading down the short peduncle, villous on the margin ; leaves broadly oblanceolate, about 6 cm. long and 2 cm. broad, rigidly leathery, glabrous ; pappus pale brown .. .. .. 17. *saussureoides*

Flower-heads more or less rounded at the base :

Pappus purple ; leaves broadly oblanceolate, acute, 6–7 cm. long, 2–2·5 cm. broad, serrate, glabrous, coarsely reticulate ; involucral bracts broadly linear-lanceolate, villous ; heads densely corymbose ; achenes tomentose .. .. .. .. .. .. .. 18. *djalonensis*

Pappus white or pale yellow :

Flower-heads 2–2·5 cm. diam. ; involucral bracts acutely setose-acumi-

nate, villous ; leaves lanceolate, about 5 cm. long and 1 cm. broad, thinly pubescent ; achenes very thinly pilose, short
19. *Hoffmanniana*

Flower-heads at most 1·5 cm. diam., often 2–3 in a cluster in the corymb ; leaves oblong-oblanceolate, rounded at the apex, subauriculate at the base, 4–8 cm. long, 1–1·5 cm. broad, pubescent on both surfaces ; achenes sharply angular, pubescent on the angles, glandular between
20. *ambigua*

††Outer pappus of short bristles or absent :

Leaves woolly- or silky-tomentose below :

Leaves coarsely toothed, lanceolate to narrowly obovate, up to 15 cm. long and 5 cm. broad, white or pale yellow-woolly below ; flower-heads very variable, 1–4 cm. diam. ; involucral bracts thinly woolly towards the apex ; achenes tomentose ; pappus-bristles flat, scarcely barbellate
21. *guineensis*

Leaves entire or minutely toothed :

Leaves sessile and rounded at the base .. .. .. 22. *Nestor*

Leaves narrow at the base :

Inflorescence a large spreading panicle ; flower-heads sessile along the branches of the panicle, about 6–8 mm. long ; bracts pubescent outside, with black tips ; leaves broadly lanceolate .. .. 23. *cistifolia*

Inflorescence a small corymb ; flower-heads 5–8 mm. diam. ; bracts appressed-villous ; leaves lanceolate, mucronate, about 3·5 cm. long and 1·3 cm. broad, silky below ; achenes villous ; stems from a woody rhizome .. .. .. .. .. .. 24. *Smithiana*

Leaves at most rather densely pubescent below :

Achenes glabrous or glandular :

Leaves pubescent below :

Leaves sessile, rounded at the base, lanceolate, the lower up to 12 cm. long and 2·5 cm. broad, nearly glabrous ; intermediate bracts glabrescent .. .. .. .. .. .. .. ..25. *Migeodii*

Leaves shortly petiolate, lanceolate, acute, 5–6 cm. long, nervose, scabrid-pubescent below ; intermediate bracts pubescent
26. *blumeoides*

Leaves glabrous but glandular-punctate below, obovate or oblanceolate, rigidly leathery, up to 10 cm. long and 3 cm. broad, closely reticulate ; flower heads very small with few tomentose tracts 27. *glaberrima*

Achenes pubescent or tomentose :

Leaves acicular, pubescent, about 1·5 cm. long ; flower-heads long-pedunculate ; involucral bracts narrowly lanceolate, very acute, appressed-pubescent, purplish .. .. .. 28. *bauchiensis*

Leaves not acicular :

Leaves coarsely toothed ; flower-heads large, about 1·5–2 cm. long, about 4–5 in a close corymb ; leaves obovate, glandular below
29. *Hillii*

Leaves entire or slightly toothed :

Intermediate bracts broadly oblanceolate, appressed-pubescent ; leaves broadly linear, entire, about 2 cm. long ; stems very short from a rhizome .. .. .. .. .. 30. *plumbaginifolia*

Intermediate bracts very narrow :

Involucre about 1 cm. long ; heads very few and crowded
31. *conyzoides*

Involucre about 5 mm. long ; heads usually numerous and laxly corymbose .. .. .. .. .. .. .. 32. *cinerea*

**Trees, shrubs or climbers :

Outer pappus of short scales or setae broader than the inner bristles ; climber ; leaves ovate, acute, up to 7 cm. long and 3·5 cm. broad, thin, minutely glandular-punctate, entire or undulately toothed ; inflorescence widely paniculate-corymbose ; flower-heads about 6 mm. long .. .. .. 33. *Biafrae*

Outer pappus of shorter setae or absent ; trees or shrubs :

Achenes pubescent :

Heads several to many-flowered :

Leaves narrowly oblong-obovate, coarsely jagged-toothed, up to 30 cm. long and 10 cm. broad, nearly glabrous, with numerous lateral nerves ; flower-heads very numerous, subcylindric ; bracts glabrous .. 34. *myriantha*

Leaves entire or minutely toothed, obovate-oblanceolate, up to 15 cm. long and 5 cm. broad, finely glandular below ; lateral nerves few ; flower-heads numerous, campanulate ; bracts ciliate.. .. .. 35. *amygdalina*

Heads very small and 1-flowered, very numerous in a large spreading corymb ; leaves oblong-lanceolate, rounded at the base, 12–14 cm. long, 4–6 cm.

broad, puberulous above, woolly-tomentose below, sharply serrulate; outer involucral bracts pubescent .. .. .. .. .. 36. *uniflora*

Achenes glabrous or glandular:

Heads rather small, about 5 mm. diam.:

Flower-heads corymbose; leaves obovate, thinly pubescent below, up to about 15 cm. long and 10 cm. broad; involucre campanulate, with dry obovate bracts; pappus pale brownish white .. .. .. 37. *colorata*

Flower-heads paniculate:

Branches of the panicle short, with few heads clustered at the ends; leaves obovate; inner involucral bracts caducous, the others slightly ciliate 38. *Doniana*

Branches of the panicle elongated with the flower-heads distributed along it and subsessile; leaves elongate-obovate, large, up to 40–50 cm. long and 20 cm. broad, coarsely lobulate-dentate .. .. .. 39. *conferta*

Heads large, about 2·5 cm. diam., sessile on the branches of the panicle, crowded; bracts dry and glabrescent; leaves large, elongate-obovate, coarsely toothed, softly tomentose below .. .. 40. *frondosa*

1. **Vernonia pumila** *Kotschy & Peyr.* Pl. Tinn. 37, t. 17A.—F.T.A. 3; 292: Chev. Bot. 357. Perennial with herbaceous pale-pubescent stems up to about 2 ft. high, woody below with woody stock and thickened spindle-shaped roots; flower-heads blue-purple ¾–1 in. in diameter, appearing after bush burning.
French Sudan: Sarankoro (Feb.)! French Guinea: Rio Nunez. Ditinn to Labé! Dahomey: Atacora Mts., 1,700 ft. (June)! N. Nigeria: Zungeru (Jan.)! Kontagora (Jan.)! North of Zaria (Feb.)! Bauchi Plateau, Naraguta! Vom, 3,000–4,500 ft. (Jan.)! Ilorin! Extends to E. Sudan and Uganda. Exsicc.—*Rowland.* *Elliott* 26. *Dalz.* 190; 386. *Hill* 30. *Dent Young* 139. *Chev.* 12896; 24064. (See Appendix).

2. **V. chthonocephala** *O. Hoffm.* in Bol. Soc. Brot. 13: 17. Dwarf woody stem or rootstock with sometimes rather large leaves and blue- or red-purple flower-heads 1 in. in diameter appearing from the ground after burning.
Togo: Bismarckburg. N. Nigeria: Bauchi Plateau Vom, 3,000–4,500 ft. (Jan.)! Also in Angola and Nyasaland. Exsicc.—*Dent Young* 133. *Buettner* 379.

3. **V. nigritiana** *Oliv. & Hiern*—F.T.A. 3: 288; Holl. 3: 380; Chev. Bot. 355. *V. baoulensis* A. Chev. Perennial, erect, branched, with pithy stems, 1–2 ft. high, with harsh foliage and strikingly deep-red or purple flower-heads 1–2 in. in diameter.
French Sudan: Ouacoro (Dec.)! Koulikoro! Senegal: Kaolak! Casamance! French Guinea: Timbo! Kankan! Futa-Jallon, Irébéléya to Timbo! Sierra Leone: Lomaburn, N. Tambakka (Feb.)! Fundembaia (Oct.)! Ivory Coast: Baoulé Nord! Gold Coast: Afram Plains (Jan.)! Salaga! N. Nigeria: Lokoja (Sept.)! Jebba! Zungeru (Nov., Dec.)! Kontagora (Nov.)! Bauchi Plateau, Ropp, 4,600 ft.! Vom! Yola (Oct.)! S. Nigeria: Lagos Colony! Abeokuta! Exsicc.—*Barter* 753. *Baikie* 19. *Irving.* *Sc. Elliot* 5034. *Brown-Lester* 60. *Rowland.* *Elliott* 13. *Dawodu* 234. *Krause.* *Chev.* 22120; 22147; 22337. (See Appendix).

4. **V. Tenoreana** *Oliv.*—F.T.A. 3: 290. *V. lasiolepis* A. Chev. Bot. 355. *V. latisquama* Mattf. Erect, branched, ribbed, pithy stems up to 6–7 ft. high with rather large white flower-heads 1–1½ in. across.
Dahomey: near Porto-Novo (Jan.)! S. Nigeria: Ebute Metta! Abeokuta (Jan.)! Ibadan! Idogun! Abo! Also in Cameroons. Exsicc.—*Barter* 368. *Rowland.* *Millen* 94; 129. *Dawodu* 123. *Chev.* 14062; 22786. (See Appendix).

5. **V. stenostegia** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Candidea stenostegia* Stapf in Bot. Mag. t. 8981. Erect pithy stems 2–5 ft. high softly pale-pubescent, with light bluish-purple flower-heads 1 in. or more across when open.
N. Nigeria: Nassarawa! Bauchi Plateau, Naraguta (Feb.)! Vom, 3,000–4,500 ft. (Dec.)! Jos (Mar.)! Exsicc.—*Robins.* *Lely* P. 160. *Dent Young* 136. *Hill* 10.

6. **V. Kotschyana** *Sch. Bip.*—F.T.A. 3: 289; Holl. 3: 380; Chev. Bot. 355. Erect, pithy, striate, sparsely pubescent stems 2–5 ft. high, with pale bluish-purple flower-heads 1–1½ in. in diameter.
N. Nigeria: Sokoto! Katagum (Sept.)! Bauchi Plateau, Mongu, 4,300 ft. (July)! Bornu, L. Chad! Extends to N. Cameroons and E. Sudan. Exsicc.—*Dalz.* 173. *Lely* 151; 385. *Talb.* 1015. (See Appendix).

7. **V. insignis** *Hook. f.*—F.T.A. 3: 292. Erect, branched, brownish-pubescent on the branchlets and inflorescence, up to 10–15 ft. high, with flower-heads mauve, 1–1½ in. in diameter fairly numerous forming a corymb.
Cameroons Mt., 3,000–8,000 ft. (Dec.)! Exsicc.—*Mann* 1925. *Maitland* 1027.

8. **V. Calvoana** *Hook. f.*—F.T.A. 3: 293. Shrub 8–12 ft. or more high, with ribbed fulvous-pubescent pithy branches, and purplish flower-heads 1½ in. in diameter with whitish outer bracts.
Cameroons Mt.: Buea (Dec.)! common up to upper edge of forest, about 7,000 ft. (Dec.–Feb.)! Exsicc.—*Mann* 1238. *Dalz.* 8325. *Dunlap* 112. *Maitland* 124; 242. *Mildbraed* 10817. *Migeod* 38; 49. (See Appendix).

9. **V. purpurea** *Sch. Bip.*—F.T.A. 3: 281; Chev. Bot. 357. Stiff erect scabrid plant with ribbed stem, simple with one flower-head or branched above, from a few inches to 4 ft. high; flower-heads deep red-purple ¾–1 in. in diameter.
French Sudan: Koulikoro; Wagadugu. French Guinea: Kouria (Sept.)! Futa-Jallon, several localities. Ivory Coast: Mankono and neighbourhood; Upper Sassandra, Touro country, Gouékouma, 3,000 ft. Gold Coast: Yeji! N. Nigeria: Nupe! Bauchi Plateau, plains between Hepham and Ropp, 4,600 ft. (July)! Vom! Also in Congo Basin, Uganda and Portuguese E. Africa. Exsicc.—*Barter* 1288. *Anderson* 27. *Lely* P. 41; 375; 376; 452. *Dent Young* 142.

10. **V. camporum** *A. Chev.* Expl. Bot. Afr. Occid. Fr. 353, name only. Erect woody herb up to 7 ft. high, with terete softly pale-pubescent stem, little branched, and narrow-turbinate purple flower-heads crowded in a long terminal inflorescence.
French Guinea: Kouroussa (Jan.)! Farana, between Farako and Tagania, common in dry bush (Jan.)! Sierra Leone: Falaba (Mar.)! Gold Coast: Ashanti, N. Agogo, Dukweisin (Dec.)! Afram Plains (Jan.)! N. Nigeria: Nupe! Exsicc.—*Chev.* 20408. *Barter* 809. *Sc. Elliot* 5222. *Chipp* 620. *Irvine* 622. *Pobéguin* 630.

11. **V. primulina** *O. Hofim.* in Warb. Kunene-Sambesi Exped. 402; Chev. Bot. 356. Perennial herb 1–2 ft. high, usually in clumps, with smooth ribbed stem simple or sparingly branched, and large solitary blue flower-heads 1½–2 in. across.
French Sudan: Bougoumi! N. Nigeria: Sokoto! Banaga (May)! Zaria (Feb., Mar.)! Bauchi Plateau, Naraguta (Nov., Jan.)! Also in Angola. Exsicc.—*Dalz.* 363. *Ryan & Bunny* 2; 31. *Lely* P. 78; 695. *Chev.* 681. (See Appendix).

12. **V. oocephala** *Baker* in Kew Bull. 1895: 68. Erect 1–2 ft. high with almost unbranched striate pale-tomentose stems, and narrow oblong whitish flower-heads ⅓–⅔ in. long crowded at the top.
N. Nigeria: between Zaria and Wazeta (Feb.)! Bauchi Plateau, Naraguta (July)! Also in Tanganyika, N. Rhodesia and N. Nyasaland. Exsicc.—*Dalz.* 367. *Lely* 67; 250.

13. **V. pauciflora** *Less.*—F.T.A. 3 : 283 ; Chev. Bot. 356. Annual erect simple or branched, 1–4 ft. high, with striate pubescent stems and bluish lilac, occasionally white, flower-heads ¾–1 in. in diameter.

French Sudan : Goundam. Senegal : Mbidjem ! Gambia : a common field weed ! French Guinea : Kouroussa (Nov.) ! Farana, Mangata, in rice fields (Jan.) ! Sierra Leone : Dantilia, Upper Niger (Mar.) ! Dahomey ! N. Nigeria : common in fields and waste places ! S. Nigeria : Lagos Colony ! Extends to E. Sudan, Abyssinia, Eritrea and E. Africa. Exsicc.—*Barter* 870. *Baikie.* *Brown-Lester* 26. *Sc. Elliot* 5291. *Phillips* 57. *Elliott* 166. (See Appendix).

14. **V. glabra** *Vatke*—F.T.A. 3 : 286. A tall glabrous herb or undershrub, 2–8 or more ft. high, with ribbed stems and turbinate bluish flower-heads ½–⅔ in. long.

N. Nigeria : Bauchi Plateau, Naraguta (Nov.) ! Vom ,3,000–4,500 ft. ! Cameroons Mt. Buea and vicinity, 3,000–4,000 ft. (Jan., Feb.) ! Also in E. Africa and Rhodesia. Exsicc.—*Dalz.* 8225. *Lely* P. 696. *Dent Young* 135. *Dunlap* 63. *Maitland* 243. *Mildbr.* 10799. *Migeod* 61.

15. **V. Perrottetii** *Sch. Bip.*—F.T.A. 3 : 272 ; Holl. 3 : 380 ; Chev. Bot. 356. Erect, branched annual, woody below, 1–2 ft. high, with reddish-purple flower-heads ½–¾ in. in diameter, solitary at the ends of the numerous branches.

A common field weed ! Extends through N. Cameroons to E. Sudan, Uganda, and south to Angola, Nyasaland and Rhodesia. Exsicc.—*Barter* 827. *Ingram.* *Brown-Lester* 37. *Sc. Elliot* 4263. *Rowland. Elliott* 125. (See Appendix).

16. **V. elegantissima** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Slender erect slightly branched herb 12–15 in. high, with ribbed stems and small red-purple flower-heads ¼–⅓ in. long fairly numerous on slender pedicels.

N. Nigeria : Lokoja, Patti (Nov.) ! Also in Congo Basin. Exsicc.—*Dalz.* 36.

17 **V. saussureoides** *Hutch.* in Kew Bull. 1921 : 378. Erect glabrous pithy stems 2–3 ft. high clustered from a woody base, with top-shaped heads of cornflower blue florets ½–¾ in. long.

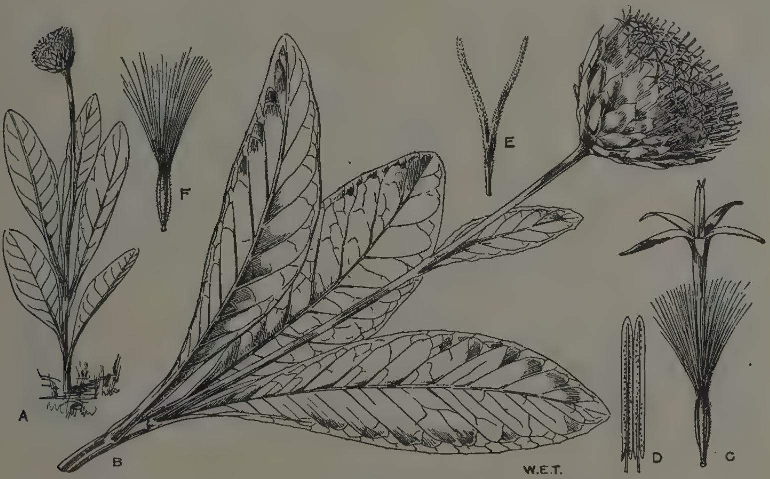

FIG. 227.—VERNONIA PRIMULINA *O. Hoffm.* (COMPOSITAE).

A, whole plant. B, portion of same. C, flower. D, anthers. E, style-arms. F, achene and pappus.

N. Nigeria : Bauchi Plateau, Naraguta (June, Apr.) ! Vom, 3,000–4,500 ft. ! Exsicc.—*Lely* P. 236 ; 286. *Dent Young* 140.

18. **V. djalonensis** *A. Chev.* Expl. Bot. Afr. Occid. Fr. 354. Erect stout soft-stemmed undershrub unbranched except at the top, with crowded leaves and broadly turbinate vinous-purple flower-heads ¾ in. across when open.

French Guinea : Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Sept., Oct.) ! Boulivel (Mar.) ! Timbo to Ditinn (Sept.) ! Exsicc.—*Chev.* 18568, etc.

19. **V. Hoffmanniana** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *V. lappoides* O. Hoffm. in Bol. Soc. Brot. 13 : 19, not of Baker. Perennial herb woody at the base, simple or sparingly branched except for the inflorescence, ribbed and loosely hairy, with purplish flower-heads about 1 in. in diameter, few in a corymb.

N. Nigeria : Bauchi Plateau, Ropp, 4,600 ft. (July) ! Vom ! Also in Congo, Angola, Nyasaland and Rhodesia. Exsicc.—*Lely* 453. *Dent Young* 132.

20. **V. ambigua** *Kotschy & Peyr.* Pl. Tinn. 35, t. 17B ; F.T.A. 3 : 272 ; Chev. Bot. 352. *V. Klingii* O. Hoffm. & Muschler. *V. Courtettii* O. Hoffm. & Muschler. *V. Benthamiana* A. Chev. Bot. 353, not of Oliv. & Hiern. Erect coarse annual ½–2 ft. high, with ribbed pubescent stems woody below, and blue- or reddish-purple flower-heads ½ in. in diameter.

Common in waste places and in grasslands ! Extends to E. Sudan. Exsicc.—*Barter* 824 ; 942. *Moloney Sc. Elliot* 5410. *Dawodu* 355. *Chev.* 18288 bis ; 18317 ; 20529 ; 20895 ; 23676 ; 24083. (See Appendix).

21. **V. guineensis** *Benth.*—F.T.A. 3 : 285 ; Chev. Bot. 354 *V. firma* Oliv. & Hiern. *V. procera* O Hoffm. ; Chev. Bot. 357. Erect 2–4 or more ft. high, little branched from a thick woody stock, the stems and underleaf whitish or ochrey-tomentose, with pale blue-purple flower-heads varying in size up to nearly 2 in. across.

In grass savannah, etc., from Senegal to Cameroons ! Extending to E. Sudan and south to Angola. Exsicc.—*Sc. Elliot* 4737. *Johnson* 715. *McLeod* 817. *Dalz.* 659. *Lely* 70 ; P. 88 ; P. 179 ; 242 ; 721. *Foster* 280. *Baumann* 92. *Schlechter* 12964. *Migeod* 295. *Chev.* 23569. (See Appendix).

22. **V. Nestor** *S. Moore* in Journ. Linn. Soc. 35 : 317. *V. chariensis* O. Hoffm. Stiff erect half woody 1–2 ft. high branched only at the top with rather crowded leaves striate hairy stem and red-purple flower-heads ⅓ in. long, numerous, corymbose.

N. Nigeria : Kontagora (Nov.) ! Bauchi Plateau, Vom, 3,000–4,500 ft. ! S. Nigeria : Bamenda, 5,000 ft. ! Also in Shari-Chad and Nyasaland. Exsicc.—*Dalz.* 202. *Dent Young* 141. *Migeod* 301.

23. **V. cistifolia** O. Hoffm. in Engl. Pflanzenw. Ost-Afr. C : 404. A soft-wooded undershrub 6 ft. high, shortly pubescent, with rather small red-purple flower-heads ¼–⅓ in. long in cymes forming a large panicle 1 ft. long.

N. Nigeria : Bauchi Plateau, Naraguta, in long grass amongst rocks (Nov.) ! Also in E. Africa. Exsicc.—*Lely* 691.

24. **V. Smithiana** *Less.*—F.T.A. 3 : 276 ; Chev. Bot. 358. *V. gnaphalioides* A. Chev. Erect branched with ribbed stems 1–2 ft. high from a woody base, pale-silky when young, with rather small red-purple hemispherical flower-heads ¼ in. broad in small dense terminal corymbs.

French Sudan : Moriguéya (Feb.) ! Moussaia ! Diendénia in dry bush ! French Guinea : Beyla, Diedédou and neighbourhood (Feb.) ! Futa-Jallon, Bilima-Kante (Mar.) ! Farana, etc. ! Exsicc.—*Chev.* 434. 20850, etc. (see Chev. l.c.).

25. **V. Migeodii** *S. Moore* in Journ. Linn. Soc. 35 319. Erect, branched, with pithy ribbed slightly pubescent stems and purplish campanulate flower-heads ⅓ in. long, numerous, corymbose.

N. Nigeria : Lokoja (Oct.) ! Benue R. (without precise locality) ! S. Nigeria : Lagos Colony ; Ogbomosho ! Awka ! Obu ! Exsicc.—*Migeod. Rowland. Phillips* 50. *Dalz.* 32. *N. W. Thomas* 33 ! 367 · 428. *Talb.* (no number). (See Appendix).

26. **V. blumeoides** *Hook. f.*—F.T.A. 3 : 281. Erect, little-branched, pithy undershrub, 2–4 ft. high, with shortly pubescent striate stems and red-purple flower-heads ¼–⅓ in. broad in dense terminal corymbs.

Cameroons Mt., grasslands, up to 8,000 ft. (Nov., Jan., Feb.) ! Exsicc.—*Mann* 1241 ; 1921. *Dalz.* 8318. *Dunlap* 199. *Kalbreyer* 143. *Mildbr.* 10830. *Maitland* 828. *Migeod* 288.

27. **V. glaberrima** *Welw.* ex *O. Hoffm.* in Bol. Soc. Brot. 13 : 15. Erect slightly branched undershrub 1–6 ft. high, scabrid-pubescent only on the young parts soon glabrous, with striate pithy stems and rather small purplish flower-heads ¼ in. long in a copious loose corymbose inflorescence.

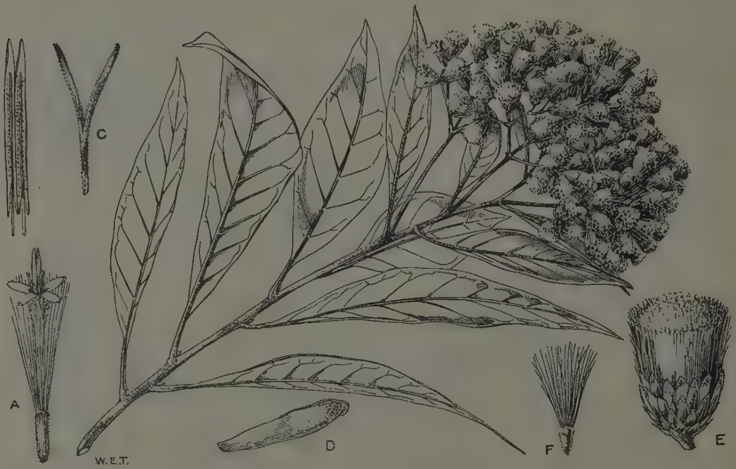

FIG. 228.—VERNONIA AMYGDALINA *Del.* (COMPOSITAE).

**A, flower. B, anthers. C, style arms. D, involucral bract. E, flower-head. F, achene and pappus.**

French Guinea : Kaba Valley. Sierra Leone : Falaba (Mar.) ! Also ? locality ! Ivory Coast : Upper Sassandra, Dyola country, Mt. Boho (May). Togo : Bismarckburg ; Agome Mts. Dahomey : Djougou (June) ; Atacora Mts., from Pobégou to Birni, 1,600 ft. (June) ! N. Nigeria : Auchang (Feb.) ! Bauchi Plateau, Naraguta (Jan.) ! Extends to Angola, Uganda, Tanganyika and Rhodesia. Exsicc.—*Sc. Elliot* 5152. *Dalz.* 346. *Burbridge* 543 ; 554. *Lely* 65 ; 75 ; P. 106. (See Appendix).

28. **V. bauchiensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Herb 6 in. high, branching from a woody base, slightly pubescent, with purple flower-heads ½ in. long solitary at the ends of the branches.

N. Nigeria : Bauchi Plateau (Jan.) ! Exsicc.—*Lely* P. 86.

29. **V. Hillii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Herbaceous undershrub about 2 ft. high, with purple flower-heads ½–¾ in. long in a terminal cluster.

Cameroons Mt., Moyuko, 2,000 ft. ! Exsicc.—*Hill.*

30. **V. plumbaginifolia** *Fenzl.*—F.T.A. 3 : 279 ; Chev. Bot. 356, partly. Stems herbaceous slender striate thinly pubescent 1–2 ft. high, from a woody base, with purplish subcampanulate flower-heads ¼–½ in. across when open.

French Sudan : Bambanatoumba (Mar.) ! Banfara, near Banan (June) ! Extends to E. Sudan. Exsicc.—*Chev.* 525 ; 560.

31. **V. conyzoides** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Stems herbaceous striate pubescent with whitish curved hairs, woody below, with purple campanulate flower-heads ⅓–½ in. across.

Sierra Leone : Limba, Bafodeya (Apr.) ! Makumri (June) ! Falaba (Mar.) ! Exsicc.—*Sc. Elliot* 5223; 5684. *N. W. Thomas* 546.

32. **V. cinerea** *Less.*—F.T.A. 3 : 275 ; Holl. 3 : 379 ; Chev. Bot. 353. *V. undulata* A. Chev. Bot. 358, not of Oliv. & Hiern. Erect branched herb, 2–5 ft. high with striate stems, shortly pubescent, with numerous small campanulate flower-heads bluish- or reddish-purple ¼ in. broad.

A common weed of tropical Africa ! (See Appendix).

33. **V. Biafrae** *Oliv. & Hiern*—F.T.A. 3 : 270. *V. senecioides* A. Chev. Bot. 357, name only. A climbing or

straggling undershrub with ribbed puberulous branches, and copious panicles of purple campanulate, flower-heads ¼ in. wide.

French Guinea : Farana, Tonfili (Jan.) ! Sierra Leone : ? localities ! Gold Coast : Aburi Hills (Mar.) ! Cameroons Mt. 2,000–3,500 ft., Buea, etc. (Dec., Jan., Feb.) ! Exsicc.—*Mann* 1296. *Johnson* 622. *Dalz.* 8187. *Dunlap* 105 ; 154. *Maitland* 294. *N. W. Thomas* 7845. *Deighton* 511. *Chev.* 20436. *Schlechter* 12849 *Lehmbach* 135. *Migeod* 63 ; 381. *Mildbr.* 10800.

34. **V. myriantha** *Hook. f.*—F.T.A. 3 : 297. A small soft-wooded tree 10–20 ft. high with long leaves and rather small purplish or white flower-heads ¼–⅓ in. long in dense spreading terminal corymbose panicles.

French Guinea : Futa-Jallon, Dalaba Plateau, 3,600 ft. (Dec.) ! Kissi, Soundia (Feb.) ! Cameroons Mt., Buea and vicinity to Musake, 3,000–7,000 ft. (Dec., Jan., Feb.) ! Fernando Po, 4,000–5,000 ft. (Dec.) ! Exsicc.—*Mann* 622 ; 1913 ; 1936. *Dalz.* 8195. *Dunlap* 80. *Mildbraed* 10819. *Chev.* 20330 ; 20689. *Migeod* 484. *Maitland* 256 ; 516 ; 954.

35. **V. amygdalina** *Del.*—F.T.A. 3 : 284 ; Holl. 3 : 379 ; Chev. Bot. 352. A shrub or small tree 6–10 ft. high, with striate pubescent branchlets becoming glabrous, and white sweet-scented flower-heads ¼ in. broad in copious corymbose panicles.

Common, and often planted, from French Guinea to Cameroons and Fernando Po ! Extending to Congo, E. Sudan, Abyssinia, Uganda, Tanganyika and Rhodesia. Exsicc.—*T. Vogel* 257. *Barter* 722 ; 1172. *Irving* 68. *Kirk* 40. *Mann* 28. *Rowland.* *Sc. Elliot* 5753. *Dunlap* 125. *Caille* ex *Herb.* *Chev.* 15105. *Preuss* 1260. (See Appendix).

36. **V. uniflora** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub or small tree with brittle branches, with a large corymb of minute mauve flowers.

S. Nigeria : Bamenda, 6,000 ft. (Jan.) ! Exsicc.—*Migeod* 356.

37. **V. colorata** *Drake* in Bull. Soc. Bot. Fr. 46 : 230 (1899) ; Hist. Pl. Madag. Atlas t. 466. *Eupatorium coloratum* Willd. (1804). *V. senegalensis* Less. (1829)—F.T.A. 3 : 283 ; Holl. 3 : 380 ; Chev. Bot. 357.

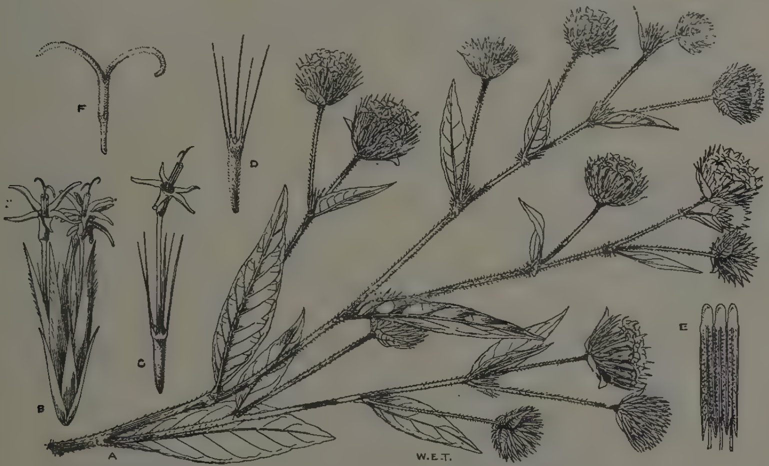

FIG. 229.—ELEPHANTOPUS SCABER *Linn.* (COMPOSITAE).

A, portion of plant. B, partial flower-head. C, flower. D, achene. E, anthers. F, style arms.

Habit of the last, 10–15 ft. high, with softly pale rusty-tomentose branchlets and white flower-heads ¼–⅓ in. broad.

Senegal and French Sudan to N. Nigeria ! Extending to Congo, E. Africa, S. Trop. Africa, Transvaal and Ngamiland. Exsicc.—*Michelin.* *Richard* 168. *Barter* 810. *Ingram.* *Brown-Lester* 73. *Sc. Elliot* 4201. *Vigne* 947. *Chev.* 2034. *Warnecke* 29. (See Appendix).

38. **V. Doniana** *DC.*—F.T.A. 3 : 295. A shrub 6 ft. high, rusty-pubescent on the branchlets and inflorescence, with small campanulate-turbinate (? purple) flower-heads ¼ in. in diameter arranged in short racemes or pedunculate clusters along a panicle nearly 1 ft. long.

Sierra Leone : Leicester Peak ! Exsicc.—*Miss Turner.*

39. **V. conferta** *Benth.*—F.T.A. 3 : 294 ; Chev. Bot. 353, partly. A tree with slender stem up to 25 ft. high, pale rusty-tomentose on branchlets and inflorescence, with large leaves crowded at the ends of the branches, and small white flower-heads in a very ample panicle.

In forest and by streams from French Guinea to Cameroons ! and Fernando Po ! Extending to Angola E. Sudan and Uganda. Exsicc.—*Don.* *Mann* 255. *Sc. Elliot* 4501. *Millen* 168. *Johnson* 882. *Lane-Poole* 25A ; 330 ; *Aylmer* 212. *Chipp* 75. *Talb.* 2012. *Baumann* 432. *Staudt* 559. (See Appendix).

40. **V. frondosa** *Oliv. & Hiern*—F.T.A. 3 : 294. A tall soft-stemmed shrub 10–20 ft. high, scarcely branched, with large leaves up to 2½ ft. long, pale tawny-pubescent on the young stem and underleaf, with campanulate white (turning yellowish) or purple flower-heads 1 in. in diameter forming an ample panicle 1–3 ft. long.

S. Nigeria : Epe, in moist grassy places ! Ondo district, in forest clearings ! Also in Cameroons. Exsicc.—*Barter* 3294. *Sankey* 9. (See Appendix).

## 49. ELEPHANTOPUS Linn.—F.T.A. 3 : 298.

Flower-heads in slender spikes, very narrow ; involucral bracts narrowly lanceolate, keeled, very acute ; achenes slightly pubescent ; pappus bristles few, minutely barbellate, one on each side vertically folded ; leaves linear to oblanceolate, up to 12 cm. long and 2·5 cm. broad, closely and minutely gland-dotted below, pilose on the nerves .. .. .. .. .. .. .. .. .. .. 1. *spicatus*

Flower-heads racemose or capitate :

Flower-heads pedunculate, racemosely arranged ; common involucral bracts leafy, broadly ovate, bluntly acuminate ; leaves more or less obovate-oblanceolate, acutely acuminate, sheathing at the base, up to 10 cm. long and 4 cm. broad, thinly and shortly pilose below and minutely glandular ; involucral bracts with sharp setose points ; achenes pubescent ; pappus of 5–6 straight setae .. .. 2. *scaber*

Flower-heads crowded in a terminal sessile cluster surrounded by leaves ; leaves linear-lanceolate, almost bullate, 10–15 cm. long, 1·5–3 cm. broad, shortly pilose on both surfaces, minutely glandular below ; involucral bracts ribbed, gradually pointed ; achenes pubescent ; pappus of numerous straight bristles 3. *senegalensis*

1. **Elephantopus spicatus** *Aublet* Pl. Guian. 2 : 808. Erect branched stiff woody herb 1–2 ft. or more high, more or less pilose, with small white flowers in narrow oblong heads forming a spike.
French Guinea : ? locality ! Sierra Leone : Leicester Peak, Mt. Aureol, Hill Station (Dec., Feb.) ! Njala (Jan.) ! Bo (Jan.) ! Liberia : Monrovia (Jan.) ! A native of tropical S. America, probably introduced. Exsicc.—*Sc. Elliot* 3863. *Farmar.* *Dalz.* 945 ; 8078. *N. W. Thomas* 7410. *Deighton* 486.
2. **E. scaber** *Linn.*—F.T.A. 3 : 299 ; Holl. 3 : 381 ; Chev. Bot. 359. Erect branched woody herb usually rather coarsely hairy and with wrinkled leaves very variable in size, 2–3 ft. high but attaining to 8 ft., with bracteate heads of white flowers $\frac{1}{2}$–$\frac{3}{4}$ in. across.
A common tropical weed ! Exsicc.—*Heudelot* 674. *Barter* (no number). *Mann* 225. *Winwood Reade.* *Sc. Elliot* 3880. *Pobéguin* 572. *Preuss* 1150. *Winkler* 676.
3. **E. senegalensis** *Oliv. & Hiern*—F.T.A. 3 : 299 ; Chev. Bot. 359. Erect woody striate stems hairy when young, with rather long narrow wrinkled leaves, and flower-heads forming a terminal cluster 1–1$\frac{1}{2}$ in. across.
Senegal ! French Guinea : Farana, at Niger sources ! Sierra Leone : Musaia (Oct.) ! S. Nigeria : Lagos Colony ! Exsicc.—*Heudelot* 646. *MacGregor* 158. *N. W. Thomas* 2659.

## 50. **TRIPLOTAXIS** Hutch. in Kew Bull. 1914 : 355, with fig.

Stems herbaceous, slender, puberulous ; leaves shortly petiolate, ovate or ovate-lanceolate, acute or subacute, 2–5·5 cm. long, 1–3·5 cm. broad, crenulate or subentire, crispate-puberulous ; flower-heads very small in lax corymbs ; peduncles slender, up to 1 cm. long, shortly pubescent ; involucral bracts 3-seriate, free, pubescent ; achenes turgid, sparingly pilose ; pappus cupular, pectinately toothed *stellulifera*

**T. stellulifera** *Hutch.* in Kew Bull. 1914 : 356, with fig. *Herderia stellulifera* Benth.—F.T.A. 3 : 298 ; Chev. Bot. 358. Erect 1–2 ft. high or decumbent herb with small white or lilac flower-heads ; a weed of plantations and roadsides.

Sierra Leone : Heddle's Farm (Dec.) ! Kennema (Nov.) ! Rowala (July) ! Pujehun (Apr.) ! Liberia : Du River ! Ivory Coast : Upper Cavally ! Attié, Alépé ! Gold Coast : Ashanti, Amentia ! S. Nigeria : Ishagama (Mar.) ! Rio del Rey ! Cameroons Mt., Buea (June) ! Fernando Po ! Extends to E. Sudan and to Angola and in St. Thomas. Exsicc.—*T. Vogel* 265. *Barter* (no number). *Sc. Elliot* 3933. *Irvine* 533. *Maitland* 34. *Migeod* 99. *Chev.* 15836 ; 17398. *Linder* 127. *Schlechter* 12309. (See Appendix).

## 51. **ERLANGEA** Sch. Bip.—F.T.A. 3 : 265.

Stems densely villous ; leaves alternate, narrowly oblanceolate, acute, up to 8 cm. long and 1·5 cm. broad, setulose above, woolly-tomentose below, sharply serrulate ; flower-heads few in a loose terminal corymb, shortly pedunculate, 1–1·5 cm. diam. ; involucral bracts very numerous, subulate-filiform, very acute, up to 1 cm. long, pubescent ; flowers all tubular ; achenes glabrous, strongly and closely ribbed ; pappus very caducous, subplumose towards the base .. .. .. .. .. *angustifolia*

**E. angustifolia** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Gymnanthemum angustifolium* Benth. *Vernonia Benthamianum* Oliv. & Hiern—F.T.A. 3 : 282 ; Chev. Bot. 353. Erect simple or slightly branched herb with fairly stout striate stems 1–2 ft. high, and blue-purple subglobose flower-heads $\frac{1}{3}$–$\frac{1}{2}$ in. in diameter.

Sierra Leone : Freetown, Hill Station (Oct.) ! Bumban (Aug., Sept.) ! Bumbuna (Oct.) ! Matotoka (July) ! Kanya (Oct.) ! Makene (Oct.) ! Exsicc.—*Barter* (no number). *N. W. Thomas* 1237 ; 1272 ; 1937 ; 2009 ; 3047 ; 3130 ; 3264 ; 3729. *Deighton* 245 ; 1219. *Glanville* 6. (See Appendix).

## 52. **HERDERIA** Cass.—F.T.A. 3 : 297, partly ; Hutch. in Kew Bull. 1914 : 354, with fig.

Stems numerous, procumbent or ascending, woolly-pubescent ; leaves spathulate-obovate, narrowed to the base, rounded or subtruncate at the apex, up to 4 cm. long and 1·5 cm. broad, sparingly dentate, thinly pubescent, glandular below ; flower-heads broadly campanulate, about 6 mm. long and in diam. ; outer involucral bracts leafy, oblanceolate, inner connate to above the middle ; flowers all tubular ; achenes 4-angled, glabrous ; pappus-setae in two rows, the outer scale-like, the inner 3–5 longer and barbellate .. .. .. .. .. .. .. .. *truncata*

**H. truncata** *Cass.*—F.T.A. 3 : 298 ; Hutch. in Kew Bull. 1914 : 354, with fig. ; Chev. Bot. 358 (incl. var. *Chevalieri* O. Hoffm.). *Vernonia Yatesii* S. Moore. Herb, woody at the base, branched, decumbent, sometimes creeping, with red or purple flower-heads ; habitat in sand or inundated places.

French Sudan : Sébi (July) ! Senegal : common ! Gambia ! Sierra Leone : Pujehun (Apr.) ! Batkanu (Jan.) ! Ivory Coast : Lower Comoé ; Mankono. Gold Coast : Ashanti, N. Prov., Bjury, by the Black Volta (July) ! Yeji ! N. Nigeria : Yola (May) ! Abinsi (May) ! S. Nigeria : Abo ! Exsicc.—*Lelièvre.* *Perrottet.* *Barter* 308. *Dalz.* 37 ; 661. *Anderson* 28. *Chipp* 506. *Chev.* 956. *Yates.*

var. **villosa** *DC.* Prodr. 5 : 13. Leaves densely villous with appressed hairs.

Senegal ! Exsicc.—*Perrottet.*

### 53. SPARGANOPHORUS Vaill.—F.T.A. 3 : 262.

Stems thinly pubescent ; leaves obovate-oblanceolate, acute, narrowed into the winged petiole, 7–15 cm. long, 2·5–6 cm. broad, crenate-serrate, minutely gland-dotted and slightly pubescent below ; flower-heads sessile and clustered in the leaf-axils ; involucral-bracts in several rows, ovate, very acute, pilose, about 5 mm. long ; achenes 3–4-angled, crowned by a shortly tubular obscurely toothed cartilaginous pappus *Vaillantii*

**S. Vaillantii** *Gaertn.*—F.T.A. 3 : 262 ; Holl. 3 : 378 ; Chev. Bot. 350. *Struchium africanum* Beauv. Fl. Owar. 1 : 81, t. 48. An erect or decumbent half-succulent herb, 2–4 ft. high, of damp localities, with white or pinkish flower-heads.

French Sudan : Négala. Senegal : Casamance, etc. ! Sierra Leone : Mofari (Jan.) ! Ronietta (Nov.) ! Tombo (Jan.) ! Ivory Coast : Bouroukrou ! Lower Comoé, at Abradine ! Lower Cavally, Tabou ! Gold Coast : Kukuruntumi, E. Akim (Mar.) ! ? locality ! Togo : Lome ! Dahomey : Lower Ouémé, at Aguégué (Mar.) ! S. Nigeria : Abeokuta, R. Ogun ! Oban ! Victoria ! Fernando Po (June) ! Extends to Congo Basin and Upper Welle ; also in Mascarene Islands and in tropical America. Exsicc.—*Heudelot* 656. *Barter* 3341. *Mann* 408. *Sc. Elliot* 4405. *Brown* 383. *Johnson* 602. *Preuss* 1351. *Warnecke* 412.

### 54. ETHULIA Linn.—F.T.A. 3 : 262.

Stems ribbed, shortly pubescent ; leaves oblanceolate to obovate-oblanceolate, acute, 6–15 cm. long, 1–4 cm. broad, serrate, shortly pubescent and glandular below ; petiole narrowly winged ; flower-heads discoid, very small, in lax corymbose terminal cymes ; involucral bracts in about 3 rows, about 2·5 mm. long, obovate, thinly pilose ; achenes 4–5-ribbed ; pappus a cartilaginous undulate ring .. .. *conyzoides*

**E. conyzoides** *Linn.*—F.T.A. 3 : 262 ; Chev. Bot. 351. An erect branched herb 2–4 ft. high, with abundant small lilac or red-purple flower-heads.

Widely spread in tropical Africa, S. Africa (Transvaal and Natal), Mascarene Islands and in the Eastern tropics.

### 55. GUTENBERGIA Sch. Bip.—F.T.A. 3 : 263.

Flower-heads small and numerous, corymbose, about 5 mm. in diam. ; involucral bracts 3–4-seriate, broadly oblong-oblanceolate, acute, pubescent outside ; ultimate peduncles about 1 cm. long ; leaves alternate, sessile, lanceolate-linear, 4–6 cm. long, discolorous, thinly pubescent above, white-woolly-tomentose below ; achenes short and ribbed, glabrous .. .. .. .. .. .. .. 1. *Rüppellii*
Flower-heads 1 cm. or more in diam., solitary to very few together :
  Flower-heads pedunculate :
    Ultimate peduncles very short ; flower-heads 1 cm. in diam. ; leaves shortly oblong-lanceolate, rounded at the base, 3–5 cm. long, 1–2 cm. broad, serrate or subentire, thinly woolly-pilose below ; involucral bracts acutely subulate-acuminate, ciliolate ; achenes 10–ribbed, glabrous .. .. .. .. .. .. 2. *nigritana*
    Ultimate peduncles elongated ; flower-heads about 2·5 cm. in diam. ; leaves oblong-lanceolate, acute, narrowed at the base, 8–12 cm. long, 2–3 cm. broad, serrulate, scabrid above, thinly woolly-pilose below ; involucral bracts about 8–seriate, all except the innermost broadly obovate, rounded and jagged at the apex, the inner acutely acuminate, glabrous ; achenes very strongly 10–ribbed 3. *macrocephala*
  Flower-heads sessile, about 3 cm. in diam., closely girt by the leaves, the latter linear-lanceolate, acute, about 3–5 cm. long, bullate, scabrid above, woolly-tomentose below ; involucral bracts numerous, lanceolate, very acute .. .. 4. *foliosa*

1. **Gutenbergia Rüppellii** *Sch. Bip.*—F.T.A. 3 : 263. Erect, branched, woody below, 1–2 ft. high, with leaves hoary on the under surface, and red-purple flower-heads ¼–⅓ in. in diameter.

N. Nigeria : Bauchi Plateau, Naraguta (July, Nov., common) ! Also in Abyssinia, Eritrea and Kenya. Exsicc.—*Lely* 464 ; 711.

2 **G. nigritana** *Oliv. & Hiern*—F.T.A. 3 : 264, incl. var. *scabra* Oliv. & Hiern l.c. *G. macrocephala* A. Chev. Bot. 351, not of Oliv. & Hiern. Erect, branching 1–4 ft. high, with puberulous striate branches, wrinkled leaves and bluish- or red-purple flower-heads ½ in. in diameter.

French Guinea : various localities ! Gold Coast : Ashanti, Wanki (June) ! N. Nigeria : Lokoja, Patti (Sept.) ! Kontagora (Dec.) ! Abinsi, in Munchi country (June) ! Bauchi Plateau, Naraguta, Vom, 3,000–4,500 ft. ! S. Nigeria : Lagos ! Lagos Colony ! Abeokuta ! Abo ! Exsicc.—*T. Vogel* 172. *Barter* 435 ; 1296. *Irving* 30. *Millen* 112. *Dawodu* 286 ; 291. *Dalz.* 206 ; 667. *Chipp* 485. *Lely* 52. *Dent Young* 131. *Chev.* 20904, etc. (see Chev. l.c.).

3. **G. macrocephala** *Oliv. & Hiern*—F.T.A. 3 : 264 ; Chev. Bot. 351. Erect, 2 ft. or more, with sparsely pubescent striate branches, and hemispherical flower-heads ¾ in. across.

S. Nigeria : Lagos, Abeokuta Rd. ! Abeokuta ! Exsicc.—*Irving*. *Millen* 62.

4. **G. foliosa** *O. Hoffm.* in Engl. Bot. Jahrb. 24 : 462. A stiff simple-stemmed herb up to 4 ft. high, with scabrid crowded narrow leaves.

Togo : Misahöhe, Angóme Tongbe (July) ! Exsicc.—*Baumann* 34.

### 56. EUPATORIUM Linn.—F.T.A. 3 : 300.

Stems glabrous or pubescent ; leaves alternate, ovate to narrowly lanceolate, subacute, 5–7 cm. long, up to 3 cm. broad, scabrid and gland-dotted below, sessile to shortly petiolate ; flower-heads crowded, shortly pedunculate, few-flowered ; involucral bracts few, broadly oblong, about 6 mm. long, pubescent outside, membranous on the margins ; achenes deeply sulcate, sparingly pubescent ; pappus of numerous barbellate bristles 7–8 mm. long .. .. .. .. .. .. *africanum*

**E. africanum** *Oliv. & Hiern*—F.T.A. 3 : 301 ; Chev. Bot. 360. *Vernonia malosana* Baker. *V. humilis* C. H. Wright. Erect herb with striate branches, 2–3 ft. high, with small white flower-heads in dense terminal corymbose cymes.

French Guinea : Farana and neighbourhood, near the Niger sources ; Konanké country, between Fassakoidou and Kisséridou (Feb.) ! Sierra Leone : Falaba (Mar.) ! Gold Coast : Kintampo (Mar.) ! Common in open forests of N. Ashanti. N. Nigeria : south of Zaria (Feb.) ! Bauchi Plateau, several localities, 3,000 to 5,800 ft. (Apr., May) ! Widely spread in tropical and South Africa. Exsicc.—*Sc. Elliot* 5148. *Dalz.* 41 ; 403. *Lely* 191 ; P. 228. *Dent Young* 145.

### 57. **MIKANIA** Willd.—F.T.A. 3 : 301.

Stems more or less pubescent ; leaves ovate-triangular, acutely acuminate, cordate to rounded-truncate at the base, 5–10 cm. long, up to 7 cm. broad, entire to coarsely lobulate-dentate, more or less puberulous and minutely glandular below ; petiole slender ; flower-heads corymbose on a slender peduncle ; involucral bracts about 5, oblong-oblanceolate, glabrous or slightly puberulous ; achenes about 4-angular, with minute sessile glands between the ribs ; pappus 1-seriate, barbellate, white or pink *scandens*

**M. scandens** *Willd.*—F.T.A. 3 : 301 ; Stapf 615 ; Holl. 3 : 382 ; Chev. Bot. 361. *M. laxa* A. Chev. Bot. 360. A climber with slender slightly pubescent or glabrous stems and numerous small cream-white or pink-tipped narrow flower-heads ¼ in. long.

Common from Senegal to Cameroons up to upper forest margin on Cameroons Mt. ! Throughout tropical Africa. Exsicc.—*Heudelot* 610. *Don.* *T. Vogel* 16b ; 22. *Barter* 186. *Irving.* *Mann* 33 ; 283 ; 496 ; 1326 ; 1924. *Sc.Elliot* 3865 ; 5843. *Cummins* 220. *Brown* 322 *Whyte.* *Farmar* 267. *Dunlap* 108. *G. P. Cooper* 40. *Preuss* 1097. *Baumann* 554. *Warnecke* 407. *Staudt* 554. *Chev.* 22651. (See Appendix).

var. **laciniata** *Hutch. & J. M. Dalz.*, var. nov. Leaves deeply partite—*M. Carteri* Baker. *M. tropaeolifolia* O. Hoffm.

S. Nigeria : Lagos Colony ! Also in Cameroons. Exsicc.—*Rowland.*

### 58. **ADENOSTEMMA** Forst.—F.T.A. 3 : 299.

Achenes smooth ; leaves long-petiolate, ovate or ovate-rhomboid, cuneate and subentire towards the base, 8–15 cm. long, 3–7 cm. broad, glabrous or nearly so below, prominently trinerved from above the base, rather sharply serrate-dentate ; flower-heads numerous and small, about 6–8 mm. long ; achenes with club-like pappus 1. *mauritianum*

Achenes closely warted :

Leaves ovate, abruptly narrowed at the base into the long petiole, crenate or coarsely serrate, 5–12 cm. long, 3–6 cm. broad, subscabrid on the nerves below ; flower-heads small and numerous ; achenes densely warted ; pappus as above 2. *Perrottetii*

Leaves oblong-lanceolate, subsessile or shortly petiolate, shallowly serrate, about 10 cm. long and 2 cm. broad (larger in specimens outside our area), glabrous ; flower-heads large and few, many-flowered ; achenes densely warted 3. *viscosum*

1. **A. mauritianum** *DC.* Prodr. 5 : 110—F.T.A. 3 : 300, in syn. Erect usually branched herb 2–4 ft. high, with rather rough stems and small white flower-heads in loose dichotomous terminal panicles.

Liberia : Bumbumi-Moala ! Cameroons Mt. 2,500–7,500 ft. (Dec.–Mar.) ! Fernando Po, 4,000–8,000 ft. (Dec.) ! Also in E. Africa, Rhodesia and Mascarene Islands. Exsicc.—*Mann* 575 ; 1218 ; 1958. *Dalz.* 8338. *Dunlap* 28 ; 52 ; 84. *Maitland* 481. *Migeod* 42 ; 129.

2. **A. Perrottetii** *DC.* l.c.—F.T.A. 3 : 300, in syn. *A. viscosum* A. Chev. Bot. 359, partly. *Siegesbeckia abyssinica* Stapf in Johnston Liberia 615, not of Oliv. & Hiern. Like the last, with white or lilac flower-heads and adhesive fruits.

French Guinea : Kouria to Ymbo ! Sierra Leone : Freetown, Hill Station (Oct.) ! Mabonto (Oct.) ! Kennema (Nov.) ! Liberia : Kakatown ! Dukwia R. ! Ivory Coast : Bouroukrou ! Middle Cavally, Tébo Lower Cavally, Toupa ! Gold Coast : Akim ! Agogo ! S. Nigeria : Lagos ! Yoruba country ! Abo ! Cameroons Mt. 3,000–5,000 ft. (Jan.) ! Also in Congo Basin and perhaps elsewhere as a weed. Exsicc.—*Barter* 1289. *Whyte.* *Dawodu* 303. *N. W. Thomas* 3637. *Deighton* 448 ; 2133. *G. P. Cooper* 2. *Chev.* 14725 ; 16528 ; 19395 ; *Maitland* 225.

3. **A. viscosum** *Forst.*—F.T.A. 3 : 299, partly ; Chev. Bot. 359, partly. A rough-stemmed herb 2 ft. or more high with white flowers like the last.

French Guinea : various localities ! Dahomey : Atacora Mts., Somba country ! Kouandé to Konkobiri ! N. Nigeria : Naraguta (Nov.) ! Widely spread in the tropics. Exsicc.—*Lely* 705. *Chev.* 12503 ; 13017 ; 13172 ; 13221 ; 14747; 18046 ; 18085 ; 20375 ; 24201 ; 24256.

### 59. **AGERATUM** Linn.—F.T.A. 3 : 300.

Stems pubescent ; leaves ovate or ovate-rhomboid, obtuse or subacute, broadly cuneate at the base, 4–7 cm. long, 2·5–4·5 cm. broad, setose-pubescent on the nerves below, trinerved from above the base, crenate ; petiole up to 5 cm. long ; flower-heads crowded, shortly pedunculate ; involucral bracts oblong-lanceolate, acute ; flowers numerous ; achenes black when dry, angular, glabrous or nearly so ; pappus of 5 chaffy bristles acuminate from a lanceolate base .. .. .. .. *conyzoides*

**A. conyzoides** *Linn.*—F.T.A. 3 : 300 ; Stapf 614 ; Holl. 3 : 381 ; Chev. Bot. 360. An erect branched annual 1–3 ft. high, with small bluish-purple or whitish flower-heads abundant in terminal corymbs.

A common weed of the tropics and subtropics ; up to 6,000 ft. altitude on Cameroons Mt. (See Appendix).

### 60. **PLEIOTAXIS** Steetz.—F.T.A. 3 : 440.

Stems and lower surface of the leaves woolly-tomentose ; leaves broadly lanceolate, acutely acuminate, acute at the base, 12–14 cm. long, 2–3·5 cm. broad, with about

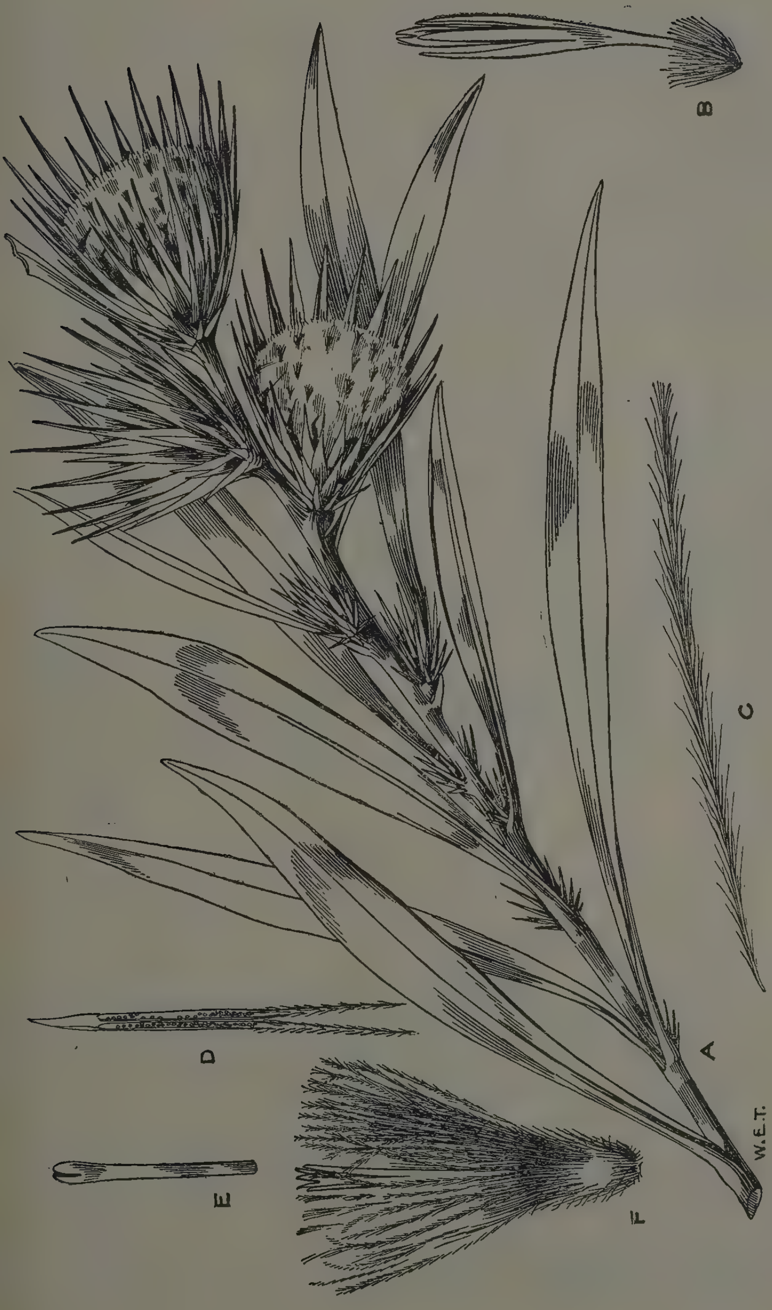

FIG. 230.—DICOMA SESSILIFLORA *Harv.* (COMPOSITAE).
A, portion of plant. B, outer flower. C, pappus-bristle. D, anther. E, style. F, inner flower.

12 pairs of parallel lateral nerves ; petiole about 1·5 cm. long, encircling the stem at the base ; flower-heads narrowly campanulate, about 4 cm. long ; involucral bracts about 8-seriate, gradually increasing upwards, the outermost ovate-triangular, about 4 mm. long, the innermost broadly lanceolate and 2 cm. long, with a broad grooved midrib ; achenes pubescent ; pappus straw-coloured, 1·5 cm. long .. *Newtonii*

**P. Newtonii** *O. Hoffm.* in Engl. Bot. Jahrb. 15 : 537 ; Chev. Bot. 377. Erect 2 ft. high with striate stems and leaves softly pale-tomentose below ; flower-heads dark red-purple.
French Guinea : Kankan ! Futa-Jallon, Irébéleya, Timbo and Mamou, 1,800–2,150 ft. (Sept.) ! Exsicc.—*Chev.* 15658 ; 18341 ; 18616.

### 61. **DICOMA** Cass.—F.T.A. 3 : 442 ; C. F. Wilson in Kew Bull. 1923 : 377.

Outer pappus of barbellate bristles, inner of lanceolate 1-nerved membranous scales ; achenes long-villous ; leaves linear-oblanceolate, white-woolly-tomentose on both surfaces ; flower-heads sessile or subsessile, about 1·5 cm. long ; involucral bracts about 5-seriate, terminating in long sharp bristles from a lanceolate base, the outer woolly .. .. .. .. .. .. .. .. .. .. 1. *tomentosa*

Outer and inner pappus of plumose bristles ; achenes densely and silky-villous ; leaves oblanceolate, up to 12 cm. long and 1·5 cm. broad, glabrous above, woolly below but sometimes becoming glabrous ; flower-heads subsessile, about 3·5 cm. long ; involucral bracts about 6-seriate, narrowly lanceolate with a bristle tip, glabrous 2. *sessiliflora*

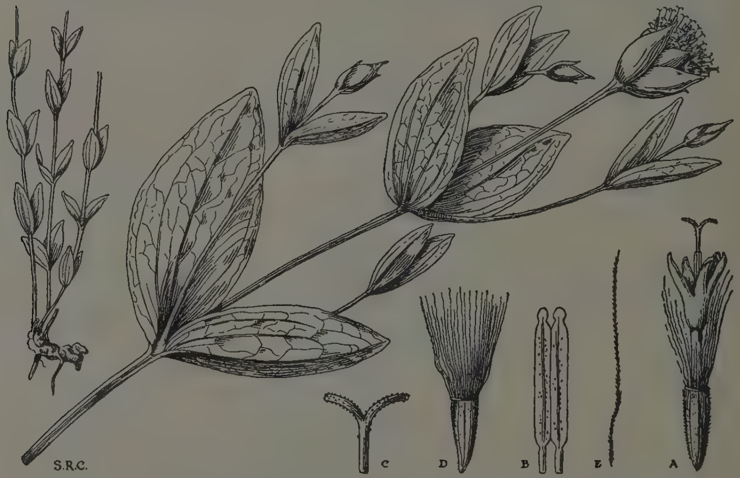

Fig. 231.—Hypericophyllum multicaule *Hutch.* (Compositae).
A, flower. B, anthers. C, style arms. D, achene and pappus. E, pappus-bristle.

1. **D. tomentosa** *Cass.*—F.T.A. 3 : 443 ; Holl. 3 : 395 ; Chev. Bot. 377. A woody herb, usually branched, 1–2 ft. high, with cottony stems and leaves and thistle-like white or pinkish flower-heads ½ in. or more long.
French Sudan : Sicoro ; Ségou. Senegal : Lamsaar (Sept.) ! Ivory Coast : ? locality ! Dahomey : Adjara. N. Nigeria : Borgu, Wawa ! Sokoto, common (Dec.) ! Katagum (Feb.) ! Kafaretti (Oct.) ! Bornu, Kuka (Jan.) ! Extends east to India, south to Angola and Transvaal. Exsicc.—*Leprieur. E. Vogel* 30. *Barter* 1299. *Dalz.* 171. *Lely* 111 ; 676. *Moiser* 179 ; 264. *Poisson.* (See Appendix).
2. **D. sessiliflora** *Harv.*—F.T.A. 3 : 444. Perennial with pithy stems from a few inches to 2 ft. high from a woody stock, and thistle-like yellowish flower-heads 1–1½ in. long ; the leaves often wine-red tinged.
N. Nigeria : Borgu ! Lokoja, Patti (Oct.) ! Kabba (Oct.) ! Auchang (Feb.) ! Abinsi (Oct.) ! Bauchi Plateau, Naraguta (Nov.) ! Extends to S. Trop. Africa. Exsicc.—*Barter* 717. *Dalz.* 33 ; 334 ; 663. *Lely* 701. *Parsons* 75.

### 62. **GERBERA** Gronov.—F.T.A. 3 : 445.

Rootstock tomentose ; leaves elliptic, rounded at the apex, narrowed into the petiole, up to 15 cm. long, entire or denticulate, sparingly pilose above, softly pilose below ; peduncle solitary, tomentose especially towards the thickened apex ; flower-heads 2·5 cm. long, erect ; involucral bracts linear, shaggy ; ray-flowers purple outside ; achenes long-beaked, papillous ; pappus rather rusty .. .. *piloselloides*

**G. piloselloides** *Cass.*—F.T.A. 3 : 445 ; Chev. Bot. 377. Stemless plant with basal leaves and 1 or few scapes up to 1 ft. or more high ; flower-head pink or purplish.
French Guinea : Diaguissa (Apr.) ! S. Nigeria : British Cameroons, Bamenda, 5,000 ft. (Jan.) ! Exsicc.—*Migeod* 365. *Chev.* 12944.

### 63. **HYPERICOPHYLLUM** Steetz in Peters Mossamb. Bot. 498, t. 50 (1863).
(*Jaumea* Oliv. & Hiern F.T.A. 3 : 395, not of Pers.)

Stems several from a woody rhizome, slightly setulose but soon glabrous, ribbed; leaves opposite, sessile, lanceolate to ovate-elliptic, obtuse at the apex, more or less rounded at the base, 5–8 cm. long, 1·5–4 cm. broad, faintly gland-dotted, reticulate on both sides; flower-heads solitary or subsolitary, about 2·5 cm. diam.; peduncle up to 15 cm. long; involucral bracts 2–3-seriate, ovate-lanceolate, acutely acuminate, about 2 cm. long, glabrous; flowers all tubular; achenes pubescent; pappus straw-coloured, subplumose .. .. .. .. .. .. .. .. *multicaule*

**H. multicaule** *Hutch.* in Kew Bull. 1907 : 50. Erect perennial with herbaceous stems 1–2 ft. high from a woody rhizome, and yellowish-green flower-heads nearly 1 in. long; appearing after bush-burning.

Ivory Coast: Upper Sassandra, Toura, between Koualé and Kouroukoro (May)! N. Nigeria: Kontagora (Jan.)! Bauchi Plateau (Feb.)! Exsicc.—*Dalz.* 52. *Lely* P. 79. *Chev.* 21756.

### 64. **BERKHEYA** Ehrh.—F.T.A. 3 : 428.

Stems with crispate hairs; leaves sessile, linear, with an acute spinescent apex, auriculate at the base, about 8 cm. long, minutely scabrid above, white-woolly-tomentose below, with numerous sharply spine-tipped teeth on the margin; flower-heads about 3 to each shoot, pedunculate; involucral bracts margined with long spines, longer than the disk-flowers; ray-flowers linear, twice as long as the disk; pappus-scales oblanceolate, serrulate .. .. .. .. .. .. .. .. .. *Spekeana*

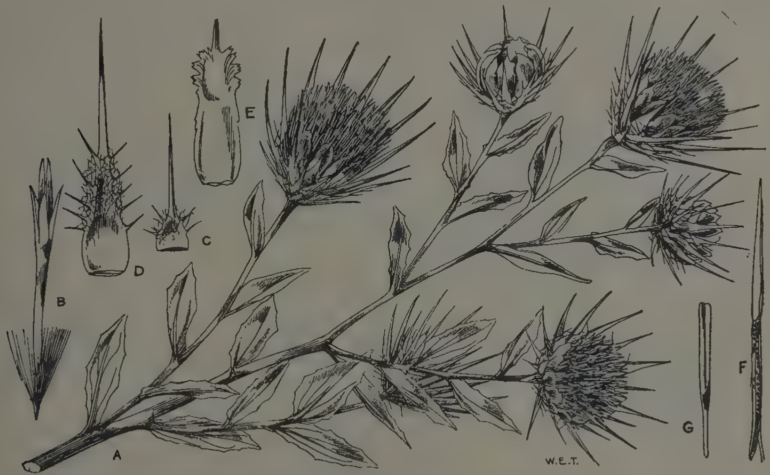

FIG. 232.—CENTAUREA SENEGALENSIS *DC.* (COMPOSITAE).

A, portion of plant. B, flower. C, outer, D, intermediate, E, inner involucral bract. F, stamen. G, upper part of style.

**B. Spekeana** *Oliv.* in Trans. Linn. Soc. Lond. 29 : 100—F.T.A. 3 : 429. Erect leafy thistle-like herb 1–2 ft. high, with ribbed pubescent stem and yellow flower-heads 3 in. in diameter.

S. Nigeria: British Cameroons, Bamenda, 7,500 ft. (Jan.)! Also in Upper Nile Land. Exsicc.—*Migeod* 380.

### 65. **CENTAUREA** Linn.—F.T.A. 3 : 436.

Middle involucral bracts with 3 nearly equal bristles at the apex; leaves with longitudinally parallel nerves, lanceolate to linear, acute, up to 10 cm. long and 1 cm. broad, thinly pubescent; achenes glabrous, with a short pappus 1. *praecox*

Middle involucral bracts pinnately divided into more than 3 bristles; leaves with pinnate nerves:

Stems winged by the decurrent leaves; leaves linear-lanceolate, acute, 7–9 cm. long, about 1 cm. broad, thinly woolly-pubescent, entire or nearly so; involucral bracts with several fine bristles, the innermost with spathulate toothed tips; achenes glabrous, with a rather short pappus .. .. .. .. .. 2. *nigerica*

Stems not winged:

Bristles of the involucral bracts short; flower-heads borne close to the ground, about 3 cm. long; innermost bracts with broad spathulate fimbriate tips; leaves oblanceolate, scabrid; achenes glabrous, with a short pappus 3. *rhizocephala*

Bristles of the involucral bracts long and spinescent, straw-coloured ; flower-heads not borne close to the ground ; leaves more or less oblanceolate, toothed or pinnately lobed, scabrid or pubescent :
Achenes with a well-developed pappus .. .. .. .. 4. *senegalensis*
Achenes without a pappus .. .. .. .. .. .. 5. *alexandrina*

1. **Centaurea praecox** *Oliv. & Hiern*—F.T.A. 3 : 438 ; Chev. Bot. 376. *C. atakorensis* A. Chev. Bot. 376. Erect, branched, 1–2 ft. high from a perennial woody stock, with bluish-purple thistle-like prickly flower-heads ¾–1 in. long sometimes appearing close to the ground, the leafy shoots elongating later.
French Sudan : Gourma, Fada and neighbourhood (July) ! Kéméné ! Gold Coast : Salaga ! Kintampo (Mar.) ! Yeji ! Togo : Yendi (Apr.) ! Dahomey : Djougou ! Atacora Mts., Nioro to Kouandé. N. Nigeria : Sokoto (Dec.) ! S. Nigeria : Yoruba country ! Exsicc.—*Barter* 1223. *Dalz.* 11 ; 405. *Anderson* 46. *Lloyd Williams* 164. *Krause.* (See Appendix).

2. **C. nigerica** *Hutch.* in Kew Bull. 1921 : 383, fig. 7. Erect 2–3 ft. high, sparingly branched above, slightly woolly, with globose-campanulate pale bluish-purple flower heads about 1 in. long.
N. Nigeria : Bauchi Plateau, Naraguta (June) ! Pankshin (Dec.) ! Exsicc.—*Lely* 252. *MacGregor* 426.

3. **C. rhizocephala** *Oliv. & Hiern*—F.T.A. 3 : 438. Usually a low plant flowering close to the ground after fires, reaching 1–2 ft. in height, with flower-heads about 1 in. long and ¾ in. broad, the outer flowers white, the central pale purplish.
N. Nigeria : Sokoto ! Nassarawa, Keana (Mar.) ! Bauchi Plateau, Naraguta ! Extends to E. Sudan. Exsicc.—*Lely* P. 54 ; 58 ; 116. *Hepburn* 15. (See Appendix).

4. **C. senegalensis** *DC.*—F.T.A. 3 : 437. Stiffly branched, scabrid-pubescent, prostrate or erect 1–2 ft. high, from a stout woody stock, with reddish-purple or bluish-white spiny flower-heads ¾ in. across.
Senegal : several localities ! N. Nigeria : Kuka (Jan.) ! Exsicc.—*Leprieur.* *Roger.* *E. Vogel* 17.

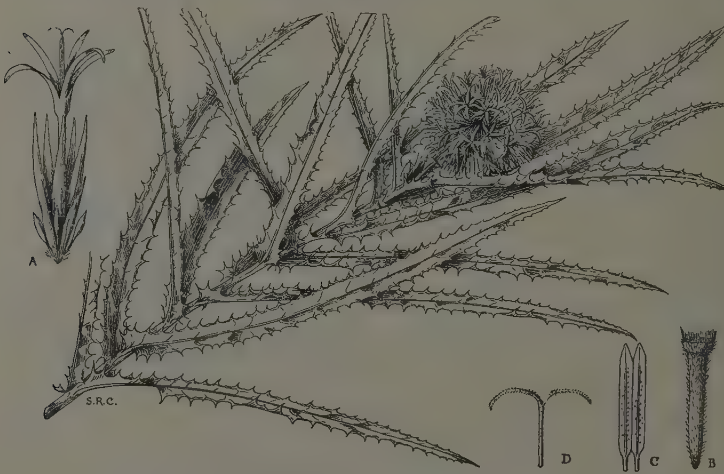

FIG. 233.—ECHINOPS LONGIFOLIUS *A. Rich.* (COMPOSITAE).
A, partial flower-head. B, achene. C, anthers. D, style-arms.

5. **C. alexandrina** *Del.* Fl. Aegypt. 280, t. 49, fig. 3. *C. Perrottetii* DC. *C. pungens* Pomel. *C. Calcitrapa* Oliv. & Hiern—F.T.A. 3 : 437, not of Linn. Like the last.
French Sudan : Silet, 2,500 ft. (Mar.) ! Senegal : Dakar ! Gambia : Sukuko (Jan.) ! N. Nigeria : Sokoto (Nov.) ! Katagum (Sept.) ! Kuka (Feb.) ! Maigumeri (Nov.) ! Also in Morocco, Algeria and Egypt. Exsicc. —*Perrottet.* *Dalz.* 176 ; 8033. *Farmar* 146a. *E. Vogel* 51. *Elliott* 129. *Moiser* 228. *Chipp* 104. *Chev.* 33834 ; 33997.

## 66. ATRACTYLIS Linn.—Benth. & Hook. f. Gen. Pl. 2 : 465.

A very prickly herb ; stems slightly pubescent ; leaves linear-lanceolate, divided into pungent points, about 2·5 cm. long, woolly when young ; flower-heads 1·5 cm. long, sessile, terminal, surrounded by the upper leaves ; inner bracts with membranous margins, thinly pubescent outside ; achenes silky-villous ; pappus plumose *aristata*

**A. aristata** *Battandier* in Bull. Soc. Bot. Fr. 49 : 291. A herb with very prickly leaves and yellow flower-heads.
French Sudan : Central Sahara ; 10 miles north of Abelessa, Oued Ravine, 3,300 ft. (Mar.) ! Also in Algeria. Exsicc.—*Chipp* 38.

## 67. ECHINOPS Linn.—F.T.A. 3 : 430 ; Mattfeld in Engl. Bot. Jahrb. 59 : Beibl. 133 : 45 (1924).

Leaves woolly with white hairs below, linear, coarsely spinose-lobulate or dentate, up to 18 cm. long and 2 cm. broad, reticulate below ; flower-heads subsessile, globose, about 5 cm. diam. ; involucral bracts of the partial heads lanceolate with a spiny point, closely denticulate in the lower part; partial heads 1-flowered; achenes pubescent .. .. .. .. .. .. .. .. .. 1. *longifolius*

Leaves glabrous below:

Stems not winged, glabrous; leaves imbricate, 2 cm. long, deeply pinnatilobed, lobes spine-tipped; flower-heads sessile, globose, 3 cm. diam.; bracts lanceolate, acute, serrulate, 5–6 mm. long, glabrous .. .. .. .. .. .. 2. *elegans*

Stems setosely winged, glabrous; leaves imbricate, about 1·5 cm. long, deeply pinnatisect with spine-tipped segments; flower-heads sessile, globose, 2·5 cm. diam.; involucral bracts of the partial heads spine-tipped, serrulate in the lower part 3. *gracilis*

1. **E. longifolius** *A. Rich.*—F.T.A. 3 : 431; Chev. Bot. 375. *E. bathrophyllus* Mattfeld. *E. otarus* Mattfeld. Erect hoary perennial 1–2 ft. high with narrow leaves sometimes 1 ft. long, and greyish-white spherical flower-heads 1 in. in diameter when in flower.

French Sudan: Ouré, etc. (Apr.). French Guinea: Kouroussa (July)! Gold Coast: Yeji! Amansare, N. Ashanti (July)! Dahomey: Savalou, between Cabolé and Bassila (May)! Djougou to Pobégou, 2,700 ft.! N. Nigeria: common in the northern savannah! S. Nigeria: Lagos Colony! Extends to E. Sudan and Abyssinia. Exsicc.—*Baikie.* *Elliott* 203. *Dalz.* 29. *Anderson* 48. *Chipp* 523. *Lely* 247. *Dent Young* 162. *Dawodu* 152. *Pobéguin* 318. *Chev.* 23934. (See Appendix).

2. **E. elegans** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *E. gracilis* A. Chev. Bot. 375, not of O. Hoffm. Erect branched 2 ft. or more high, with glabrous ribbed stems and solitary terminal flower-heads overtopped by long flowerless branchlets.

French Guinea: Beyla (Mar.)! Beyla to Sadougou (Mar.)! Ivory Coast: Upper Sassandra, Toura country, Mt. near Koualé, at the summit, 3,400 ft.! Exsicc.—*Chev.* 20864; 20871; 21703.

3. **E. gracilis** *O. Hoffm.* in Bull. Soc. Bot. Fr. Mém. 8 : 42. Perennial 1–2 ft. high from a woody stock, erect, branched, with crowded narrow leaves and spherical flower-heads ½ in. or more in diameter when in flower.

N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft.! S. Nigeria: Bamenda! Extends to E. Sudan, and up to 6,000 ft. in Bambuto Mts., Cameroons. Exsicc.—*Dent Young* (no number). *Migeod* 298; 423; 424.

## 68. **PICRIS** Linn.—F.T.A. 3 : 447.

Perennial herb; leaves all radical, oblanceolate, denticulate, 6–14 cm. long, up to 2 cm. broad, setose on both surfaces and on the margin; peduncles elongated, 1–3-flowered; involucral bracts unequal, the outer small, sparingly setose outside, up to 1·5 cm. long; achenes shortly beaked, scabrid on the ribs; pappus plumose .. *humilis*

**P. humilis** *DC.* Prodr. 7 : 130—F.T.A. 3 : 447, in obs. Erect from a hard base, 6–18 in. high, with oblong yellow flower-heads ¾ in. long, appearing after bush burning.

Senegal. N. Nigeria: north of Zaria (Feb.)! Bauchi Plateau, Naraguta (June)! Vom, 3,000–4,500 ft.! Exsicc.—*Dalz.* 392. *Lely* 24; P. 36; 341. *Dent Young* 163.

## 69. **LACTUCA** Linn.—F.T.A. 3 : 450.

Climbers:

Stems and bracts pilose with gland-tipped hairs; leaves lyrate, with a winged rhachis, one pair of lateral reflexed lanceolate lobes and a terminal triangular terminal lobe repand denticulate and about 4 cm. long, pilose-setose on the nerves below; flower-heads numerous, paniculate, 1–1·5 cm. long; achenes with a long slender beak, flattened, with several wing-like ribs, glabrous .. .. .. 1. *glandulifera*

Stems and bracts glabrous; leaves with a broadly winged basal portion and a terminal ovate-deltoid lamina, auriculate at the base; flower-heads as in *L. glandulifera* but outer bracts longer and narrower .. .. .. .. .. 2. *Dunlapii*

Erect herbs:

Achenes not compressed, about 10-ribbed, shortly beaked:

Inner involucral bracts 5, 2–3 times as long as the outer ones; leaves pinnately sagittately lobed, denticulate with crustaceous teeth; flower-heads in lax much branched panicles .. .. .. .. .. .. .. 3. *taraxacifolia*

Inner involucral bracts 8; leaves dentate or undulate with small crustaceous teeth; flower-heads rather few in the sparingly branched panicle .. 4. *goraeensis*

Achenes compressed, narrowed into a long slender beak, with only one rib up the middle, glabrous; leaves linear or linear-lanceolate, sharply auriculate at the base, entire or irregularly dentate; flower-heads narrowly paniculate .. 5. *capensis*

1. **Lactuca glandulifera** *Hook. f.*—F.T.A. 3 : 454. A climbing herb, rather viscid, with pale yellow narrow flower-heads ½ in. long.

Cameroons Mt., 7,000–8,000 ft. (Dec., Feb.)! Exsicc.—*Mann* 1240; 1917.

2. **L. Dunlapii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A straggling weed, nearly glabrous.

Cameroons Mt., 6,000 ft. (Jan.)! Exsicc.—*Dunlap* 47. *Maitland* 226. *Mildbr.* 10814.

3. **L. taraxacifolia** *Schum. & Thonn.*—F.T.A. 3 : 451; Chev. Bot. 378. A glabrous herb sometimes attaining 4–6 ft. in height, with pale yellow narrow flower-heads ½ in. long; a weed of cultivated fields and waste places, sometimes cultivated.

Senegal to Nigeria! Extends to E. Sudan and E. Africa. Exsicc.—*Perrottet* 2. *E. Vogel* 1; 47. *Barter* 3414. *Brown* 402. *Dalz.* 104; 169; 993. (See Appendix).

4. **L. goraeensis** *Sch. Bip.*—F.T.A. 3 : 452. *L. tuberosa* A. Chev. Bot. 379, name only. Erect branched weed like the last ,1–3 ft. high, with a stout woody rootstock.

Senegal: Goree Island, etc. French Guinea: Farana (Jan.)! S. Nigeria: Ebute Metta! Lagos Colony, common in savannah! Extends to Abyssinia and the Red Sea; also in Angola. Exsicc.—*Rowland.* *Millen* 133. *Dodd* 379. *Chev.* 20485.

5. **L. capensis** *Thunb.*—F.T.A. 3 : 452; Chev. Bot. 378. *L. holophylla* Baker. *L. sassandrensis* A. Chev. Bot. 378. A glabrous perennial herb, from a few inches to 3–4 ft. high or more from a woody stock, with lilac or darker purple narrow flower-heads ½–¾ in. long.

French Sudan and French Guinea to Cameroons (Cameroons Mt. grasslands up to 10,000 ft. or higher)!

Extends to E. and W. South Tropical Africa and to Cape Colony. Exsicc.—*Mann* 1300; 1928. *Sc. Elliot* 5303. *Rowland.* *Dawodu* 132. *Dalz.* 39; 341; 8313. *Lely* 22; P. 33; 136; 338. *Dent Young* 164. *Mildbraed* 10839; 10929. *Chev.* 21651; 21667. (See Appendix).

### 70. **CREPIS** Linn.—F.T.A. 3 : 448.

Perennial herb; radical leaves narrowly oblanceolate, long-attenuated into the winged petiole, denticulate with recurved teeth, glabrous, up to 20 cm. long and 2·5 cm. broad; flower-heads 2–4 on a long almost leafless peduncle; ultimate peduncles up to 10 cm. long; involucral bracts 1·5 cm. long, densely appressed-pubescent; achenes beaked, glabrous or papillous; pappus very minutely barbellate *cameroonica*

**C. cameroonica** *Babcock* ms. *C. Hookeriana* Oliv. & Hiern—F.T.A. 3 : 450, not of Ball. Erect, loosely hairy, 1–2 ft. high from a thickened base, with yellow flower-heads ⅓–⅔ in. long.
Cameroons Mt., 7,000–13,300 ft. (Dec., Jan., Feb.)! Exsicc.—*Mann* 1318; 1918. *Dalz.* 8312. *Johnston* 78. *Mildbr.* 10886. *Maitland* 848; 888; 1002. *Migeod* 199.

### 71. **SONCHUS** Linn.—F.T.A. 3 : 457; R. E. Fries in Act. Hort. Berg. 8 : 89.

Outer involucral bracts densely woolly and setose outside, inner ones setose up the middle; leaves elongate-linear-lanceolate, long-sagittate-auriculate at the base, about 20 cm. long and 1 cm. broad, doubly denticulate and sometimes with a few lateral reflexed lobes; flower-heads subumbellate, pedunculate; achene closely ribbed, glabrous, not beaked .. .. .. .. .. .. .. 1. *angustissimus*
Outer involucral bracts glabrous outside:
Stems leafy at flowering time:
Leaves entire or minutely denticulate, linear-oblanceolate, acute, about 5 cm. long and 8 mm. broad, glabrous, flower-heads at the end of straggly peduncles, about 1·5 cm. long; bracts few, obtuse .. .. .. .. .. 2. *Brunneri*
Leaves coarsely and doubly dentate, auriculate at the base, glaucous-green, the lower up to about 10 cm. long, the upper much smaller; flower-heads shortly pedunculate, 1·5 cm. long; bracts becoming hyaline; achenes narrowed towards the top, many-ribbed, minutely pubescent .. .. .. .. .. 3. *prenanthoides*
Stems leafless at flowering time:
Flowering stems very dwarf from an erect tuberous rootstock; heads densely corymbose, about 2 cm. long; achenes ribbed; pappus white; leaves separate from the flowering stems, oblanceolate, doubly denticulate, up to 15 cm. long and 4 cm. broad, glabrous .. .. .. .. .. .. .. 4. *Elliotianus*
Flowering stems about 30 cm. high, much and laxly divaricately branched; heads on slender peduncles, about 2 cm. long; achenes glabrous; pappus white; leaves confined to the base of the stem, very small and linear, entire ..5. *rarifolius*

1. **Sonchus angustissimus** *Hook. f.*—F.T.A. 3 : 458. A tall herb 4–10 ft. high, with glabrous striate hollow stems and yellow campanulate flower-heads ¾ in. long.
Cameroons Mt., grasslands, 7,000–8,000 ft. (Nov., Jan.)! Also in French Cameroons. Exsicc.—*Mann* 1311; 1919. *Dunlap* 200. *Deistel* 616. *Maitland* 260; 682; 991. *Mildbr.* 10843. *Migeod* 342; 366; 491.
2. **S. Brunneri** *Oliv. & Hiern*—F.T.A. 3 : 459. *S. Bipontinii* A. Chev. Bot. 379, not of Aschers. A woody glabrous branched herb, more or less straggling, with oblong yellow flower-heads ½–⅔ in. long.
Senegal: Sor Island! Dakar (Jan.)! Niayes (Dec.)! Exsicc.—*Brunner.* *Chev.* 2046; 2047; 2053.
3. **S. prenanthoides** *Oliv. & Hiern*—F.T.A. 3 : 459. *Launaea Chevalieri* O. Hoffm. & Muschler—Chev. Bot. 380. Pale-stemmed much-branched woody herb, with narrow oblong flower-heads ½ in. or more long.
Mauritania: Bir Igni (Feb.)! N. Nigeria: Sokoto, in fields (Feb.)! Bornu, Kuka, in sandy soil (Feb.)! Also in E. Sudan. Exsicc.—*E. Vogel* 45. *Dalz.* 411. *Chev.* 25443; 25513; 25528.
4. **S. Elliotianus** *Hiern* in Welw. Cat. Afr. Pl. 1 : 623; Chev. Bot. 379. *Lactuca nana* Baker. A perennial herb a few inches high from a cylindrical milky rhizome, with yellow oblong flower-heads numerous, ½–⅔ in. long.
French Guinea: Futa-Jallon, Diaguissa, Dalaba, etc.; Farana, at Niger sources; Beyla. Sierra Leone: Talia, Sumbaraya! Ivory Coast: Upper Sassandra, Toura country, between Sanrou and Ouodé. Gold Coast: Kintampo (Mar.)! Abafua! Dahomey: Zagnanado (Feb.). N. Nigeria: Abinsi (Oct.)! Bauchi Plateau, Vom, 3,000–4,500 ft.! S. Nigeria: Lagos Colony! Extends to Angola, E. Africa and Rhodesia. Exsicc.—*Sc. Elliot* 5010. *Rowland.* *Dalz.* 40; 665. *Dent Young* 165. *Vigne* 1808.
5. **S. rarifolius** *Oliv. & Hiern*—F.T.A. 3 : 460; Chev. Bot. 380. *Lactuca stenocephala* Baker. Erect wiry-branched herb woody below, 1–2 ft. high, with narrow oblong flower-heads ½–¾ in. long.
French Sudan: Dougoura! French Guinea: Diaguissa! Dalaba to Mamou! Sierra Leone: near Musaia, Falaba (Mar.)! N. Nigeria: Nupe! Ilorin! Extends to E. Africa, Transvaal and Madagascar. Exsicc.—*Barter* 1224. *Sc. Elliot* 5115. *Rowland.*

### 72. **LAUNAEA** Cass.—F.T.A. 3 : 460.

Radical leaves oblanceolate in outline, about 12 cm. long, pinnately lobed, lobes spreading, ovate-triangular, up to about 1·5 cm. long, sharply toothed with cartilaginous teeth; peduncles up to 25 cm. long, glabrous, bearing a few glomerate heads towards the top; flower-heads campanulate; outer bracts ovate, with broad hyaline margins, inner about 1 cm. long, lanceolate, narrowly margined; achenes short, winged, with a few ribs between the wings .. .. .. .. .. .. *glomerata*

**L. glomerata** *Hook. f.* Fl. Brit. Ind. 3 : 417.
French Sudan: Central Sahara; Silet, 2,500 ft., on bank of irrigation ditch (Mar.)! Also in Algeria, Egypt, Arabia, Persia and N.W. India. Exsicc.—*Chipp* 76; 98.

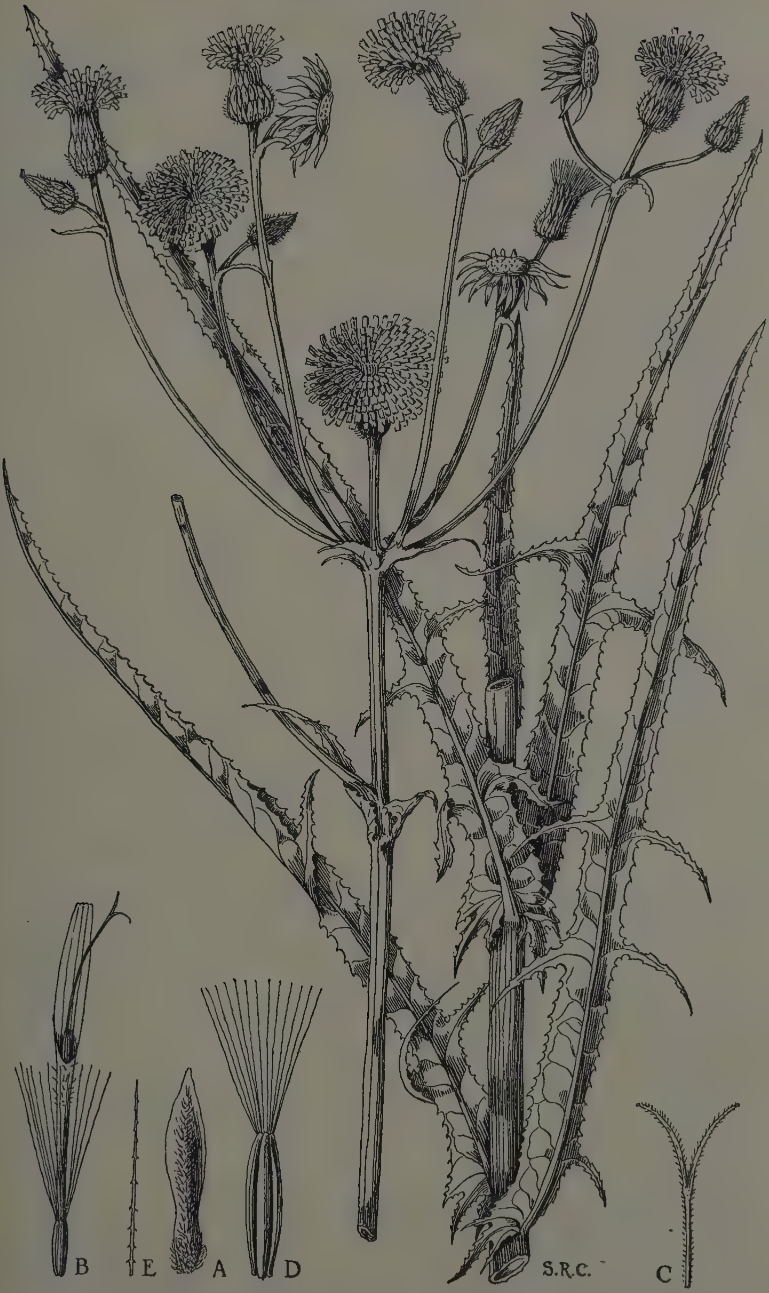

FIG. 234.—SONCHUS ANGUSTISSIMUS *Hook. f.* (COMPOSITAE).
A, involucral bract. B, flower. C, style-arms. D, achene and pappus. E, pappus-bristle.

## 126. GENTIANACEAE

Annual or perennial herbs. Leaves opposite, rarely alternate, often connate at the base; stipules absent. Flowers hermaphrodite, actinomorphic. Calyx tubular or of separate sepals, imbricate. Corolla contorted or rarely imbricate or valvate. Stamens the same number as the corolla-lobes and alternate with them, inserted on the corolla; anthers 2-celled, opening lengthwise. Disk present or absent. Ovary superior, mostly 1-celled with 2 parietal placentas, sometimes 2-celled with the placentas adnate to the septa; style simple. Ovules often numerous. Fruit usually a capsule. Seeds with copious endosperm and small embryo.

Mainly in temperate and subtropical regions, abundant in the mountains of the northern hemisphere. Recognised by the herbaceous habit, opposite exstipulate leaves, gamopetalous corolla, the stamens the same number as and alternate with the corolla-lobes, and the superior ovary with usually parietal placentas.

Leaves opposite; corolla-lobes contorted:
Leaves well-developed, green; flowers rarely solitary:
Flowers solitary in both leaf-axils all along the stems; calyx-tube ribbed 1. **Neurotheca**
Flowers in terminal dichotomous cymes:
Anthers exserted from the throat of the corolla:
Ovary 2-celled:
Stamens inserted below the corolla-sinuses .. .. .. .. 2. **Exacum**
Stamens inserted at the corolla-sinuses .. .. .. .. 3. **Sebaea**
Ovary 1-celled with parietal or sometimes intrusive-placentas:
Anthers all fertile:
Corolla-lobes without nectaries near their base .. .. 4. **Schultesia**
Corolla-lobes with 1–2 fringed nectaries near their base .. .. 5. **Swertia**
Anthers not all (usually only one) fertile; corolla-lobes without nectaries 6. **Canscora**
Anthers included in the corolla-tube .. .. .. .. 7. **Belmontia**
Flowers in dense axillary clusters all along the stems or in dense terminal clusters or heads:
Anthers exserted from the corolla tube; flowers 4-merous .. .. 8. **Faroa**
Anthers not exserted; flowers 5-merous .. .. .. .. 9. **Enicostema**
Leaves rudimentary, membranous; flowers solitary, terminal; stamens included in the corolla-tube; calyx-lobes subulate .. .. .. .. .. 10. **Voyria**
Leaves alternate, floating, ovate-orbicular, cordate at the base; flowers fasciculate; corolla-lobes induplicate-valvate; ovary 1-celled with parietal placentas 11. **Limnanthemum**

### 1. NEUROTHECA Salisb.—F.T.A. 4, 1 : 559.

Calyx 4–5 mm. long, tube as long as or shorter than the teeth, unequally 10–12-ribbed, lobes subulate-lanceolate; leaves oblanceolate, 1–2·5 cm. long, narrowed to the base; flowers small and inconspicuous.. .. .. .. .. 1. *longidens*
Calyx 1·2 cm. long, tube longer than the teeth, at most 8-ribbed; calyx-lobes about $\frac{1}{3}$ as long as the tube, triangular-lanceolate, very acute; leaves linear, up to 2·5 cm. long; flowers numerous and conspicuous .. .. .. .. 2. *loeselioides*

1. **Neurotheca longidens** *N.E.Br.*—F.T.A. 4, 1 : 560. A prostrate herb with slender angled ascending branches, or suberect 4–12 in., glabrous, with small white or pale lilac flowers solitary in the axils.
S. Nigeria: Lagos, Ikoyi, etc. (Nov.)! Also in Congo Basin, Uganda and E. Africa. Exsicc.—*Moloney*. *Dalz.* 1240.

2. **N. loeselioides** *Oliv.*—F.T.A. 4, 1 : 560; Chev. Bot. 446. *N. robusta* and *N. rupicola* Hua. Erect usually branched herb with slender angled stems 3–12 in. high, with light blue flowers $\frac{1}{3}$–$\frac{1}{2}$ in. long in opposite distant pairs; damp places, wet rocks, etc.
Senegal and French Sudan to N. and S. Nigeria, Fernando Po, etc.! Also in Congo Basin and Upper Nile Land. Introduced into Guiana and Brazil. Exsicc.—*Heudelot* 582. *Barter* 1761. *Milne*. *Sc. Elliot* 3853. *Farmar* 173. *Dalz.* 122; 1239; 8089. *Talb.* 3082. *Pobéguin* 13; 604. *Chev.* 20198; 20227. *Paroisse* 194.

### 2. EXACUM Linn.—F.T.A. 4, 1 : 545.

A slender annual up to 0·75 m. high, glabrous; leaves linear to ovate, acute, up to 6 cm. long, 3–5-nerved; flowers in terminal cymes; pedicels up to 1·4 cm. long; sepals ovate, 4 mm. long, broadly winged on the keel; corolla campanulate, tube 3 mm. long, the lobes shorter than the tube; anthers exserted; capsule globose, 4 mm. diam. .. .. .. .. .. .. .. .. 1. *quinquenervium*

1. **E. quinquenervium** *Griseb.*—F.T.A. 4, 1 : 546; Chev. Bot. 445. Erect herb of wet places, the stems simple or branched, sometimes purple-tinged, with pale blue-purplish flowers turning yellow in drying.

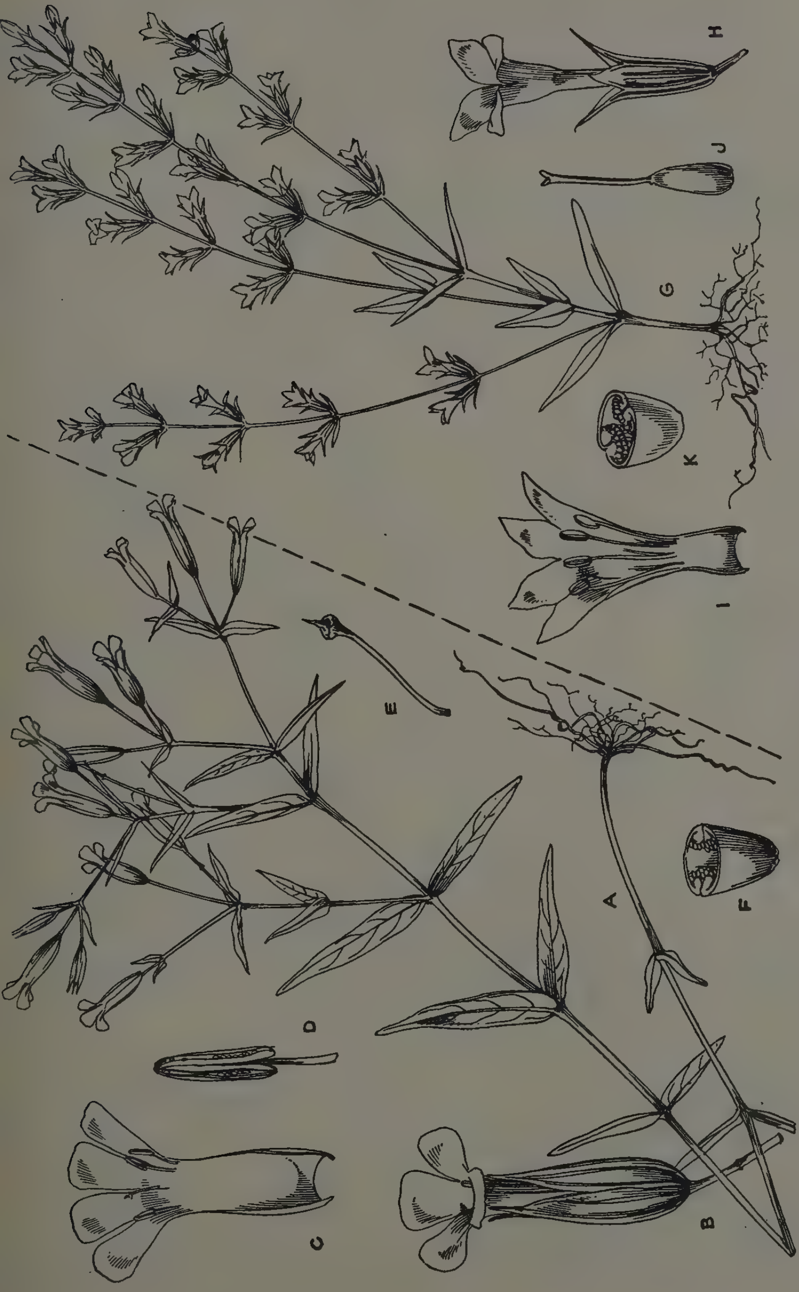

FIG. 235.

A, CANSCORA DECUSSATA *Roem. & Schult.* B, flower. C, corolla laid open. D, stamen. E, style. F, cross-section of ovary. G, NEUROTHECA LOESELIOIDES *Oliv.* H, flower. I, corolla laid open. J, pistil. K, cross-section of ovary (GENTIANACEAE).

Senegal: Casamance, Itou (Jan.)! French Guinea: Kankan! S. Nigeria: Lagos and neighbourhood, Apapa, etc. (Oct.)! Onitsha! Aguku! Also in E. Africa and the Mascarene Islands. Exsicc.—*Barter* 140; 1750. *Rowland*. *Dalz.* 1254. *N. W. Thomas* 1057. (See Appendix).

### 3. **SEBAEA** R. Br.—F.T.A. 4, 1 : 546.

Annual up to 0·75 m. high; stems narrowly 4-winged; leaves sessile, orbicular, cordate at the base, minutely apiculate, up to 1·4 cm. diam.; flowers in dense subcapitate cymes; pedicels up to 3 mm. long; flowers 5-merous; sepals lanceolate, acute, 5 mm. long; corolla-tube 4 mm. long, lobes spathulate obovate, 3 mm. long; anthers exserted, tipped by a small gland .. .. .. .. .. .. *multinodis*

**S. multinodis** *N.E.Br.*—F.T.A. 4, 1 : 548. Erect glabrous herb 1–2 ft. high, usually branching low down, narrowly 4-winged, with bright yellow flowers ½ in. long or more.

Cameroons Mt., grasslands 7,000–9,000 ft. or higher (Nov.–Feb.)! Fernando Po, 8,500 ft. to the summit (Dec.)! Also on the mountains of Uganda, E. Africa, Angola and S. Rhodesia. Exsicc.—*Mann* 320; 598; 1239; 1983. *Johnston* 8. *Dalz.* 8334. *Dunlap* 205. *Mildbraed* 10879.

### 4. **SCHULTESIA** Mart.—F.T.A. 4, 1 : 559.

Erect annual up to 25 cm. high; stems 4-angled in the upper part; leaves sessile, ovate-lanceolate to narrowly oblong, thin, glabrous, 1·5–4 cm. long; flowers large, few, cymose; pedicels ascending; calyx 1·5 cm. long, segments subulate-acuminate, broadly winged and reticulate, dry; corolla-tube longer than the calyx; segments broadly obovate; capsule enclosed in the persistent calyx *stenophylla* var. *latifolia*

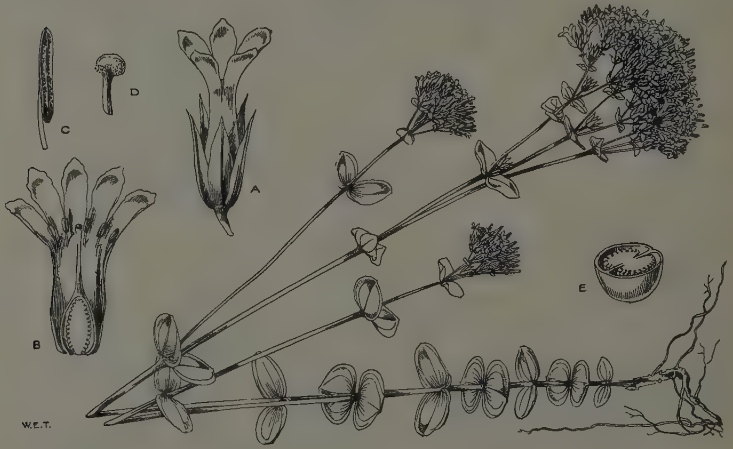

FIG. 236.—SEBAEA MULTINODIS *N.E. Br.* (GENTIANACEAE).

A, flower. B, longitudinal section of flower. C, stamen. D, stigma. E, cross-section of ovary.

**S. stenophylla** var. **latifolia** *Mart.*—F.T.A. 4, 1 : 559; Chev. Bot. 446. Erect herb 3–18 in. high, stems simple or slightly branched, 4-angled in the upper part, with bluish (when dry) flowers ¾–1 in. long.

Senegal: Casamance, several localities! Gambia, south bank! Also in Brazil and possibly introduced from there. Exsicc.—*Heudelot* 551. *Brown-Lester* 39. *Chev.* 2821; 2823.

### 5. **SWERTIA** Linn.—F.T.A. 4, 1 : 570.

Leaves ovate or obovate:
  Sepals spathulate-obovate, very narrow at the base, 6–7 mm. long; stems and pedicels smooth; corolla 1 cm. long; capsule bluntly beaked, 1·3 cm. long 1. *subalpina*
  Sepals oblong-lanceolate or narrowly oblanceolate:
    Stems and pedicels scabrid; leaves sessile, broadly ovate, 1·5–2·5 cm. long; flowers crowded, shortly pedicellate; corolla 1·3 cm. long .. .. 2. *clarenceana*
    Stems and pedicels smooth; leaves sessile, 1–2 cm. long; flowers rather lax, on slender pedicels; corolla 7–8 mm. long .. .. .. .. 3. *dissimilis*
Leaves narrowly lanceolate:
  Leaves about 1·5 cm. long, minutely papillous-scabrid on the margin; cymes many-flowered; sepals narrowly lanceolate, 3 mm. long; corolla 8 mm. long; fruit ribbed, 7 mm. long, glaucous .. .. .. .. .. .. 4. *Mannii*

Leaves 1–1·5 cm. long, other characters more or less as above ; whole plant very small, about 5–6 cm. high .. .. .. .. .. .. .. .. 5. *caerulea*

1. **Swertia subalpina** *N.E.Br.*—F.T.A. 4, 1 : 578. Herb, slightly woody at the base, 3–9 in. high, with a few leaves crowded near the base, and light yellow flowers ⅓ in. long.
   Cameroons Mt., grasslands, 8,000–10,000 ft. (Jan.) ! Exsicc.—*Mann* 1216.
2. **S. clarenceana** *Hook. f.*—F.T.A. 4, 1 : 578. A much-branched herb, with erect narrowly winged stems 1–1½ ft. high, and yellow flowers ⅓ in. long in panicled cymes.
   Fernando Po, 8,500 ft. to the summit (Dec.) ! Exsicc.—*Mann* 596.
3. **S. dissimilis** *N.E.Br.*—F.T.A. 4, 1 : 579. Erect branched herb 8–16 in. high, with smooth angled stems, and flowers ⅓ in. long white with blue lines, in lax cymes, the stems and under surface of leaves sometimes brown-purple.
   Cameroons Mt., grasslands, 6,000–9,000 ft. (Nov., Dec.) ! Exsicc.—*Mann* 1994. *Johnston* 89. *Mildbraed* 10880.
4. **S. Mannii** *Hook. f.*—F.T.A. 4, 1 : 581. Slender stiff erect herb with 4-angled sometimes brown-purple stems and leaves, and white flowers ⅓ in. long numerous in panicled cymes.
   N. Nigeria : Vom ! Jos ! Cameroons Mt., grasslands, 7,000–10,000 ft. (Nov., Dec.) ! Exsicc.—*Mann* 2000. *Johnston* 90. *Mildbraed* 10860. *Dent Young*. *Saunders*.
5. **S. caerulea** *A. Chev.* in Bull. Soc. Bot. Fr. Mém. 8 : 183 ; Chev. Bot. 446. A dwarf herb, glabrous, with small yellow flowers in small terminal cymes.
   French Guinea : Futa-Jallon, various localities, 4,000 ft. (Sept., Oct.) ! Exsicc.—*Chev.* 18429 ; 18438 ; 18551 ; 18686 ; 18759 ; 18785.

### 6. **CANSCORA** Lam.—F.T.A. 4, 1 : 557.

Calyx 1 cm. long ; tube ventricose ; teeth 4, short, ovate-lanceolate ; corolla half as long again as the calyx ; leaves lanceolate, acute, 2–3 cm. long, 3-nerved from the base, glabrous ; flowers few in leafy cymes ; pedicels stout ; perfect stamen 1
1. *decussata*

Calyx 4–5 mm. long, narrow ; teeth 4, subulate, 1 mm. long ; corolla a little longer than the calyx ; leaves ovate or ovate-elliptic, acute, 1–3·5 cm. long, thin, 3–5-nerved from the base, glabrous ; flowers numerous in leafy cymes ; pedicels filiform
2. *diffusa*

1. **C. decussata** *Roem. & Schult.*—F.T.A. 4, 1 : 557 ; Chev. Bot. 445. Erect branched herb with narrowly 4-winged stems, glabrous ; flowers white or pinkish, ⅓–½ in. long.
   Senegal : Casamance, Sedhiou to Tambanaba ! Togo : Lome ! S. Nigeria : Onitsha ! Ogurude (Jan.) ! Also in Congo Basin to E. Africa and Madagascar ; also in tropical Asia and Australia. Exsicc.—*Barter* 1755 . *Holl.* 266. *Warnecke* 298.
2. **C. diffusa** *R.Br.*—F.T.A. 4, 1 : 558 ; Chev. Bot. 445. Erect herb much-branched with slender 4-angled stems a few inches to 1 ft. or more high, and narrow pinkish white or lilac flowers ¼–⅓ in. long.
   French Sudan : Badumbé (Dec.) ! Tabacco (Oct.) ! Senegal ! French Guinea : Farana, Sambadougou (Jan.) ! Sierra Leone : Charlotte Falls (Dec.) ! Makump (Jan.) ! Kofu Mt., in bed of a stream (Jan.) ! Other localities common in damp places. N. Nigeria : Nupe ! Kontagora (Nov.) ! Lokoja ! Sokoto ! Bauchi Plateau, Naraguta (Nov.) ! Extends to E. Africa, south to Nyasaland, and to Asia and Australia. Exsicc.—*Heudelot* 170. *Barter* 806. *Sc. Elliot* 4505. *Dalz.* 57. *Lely* 118 ; 703.

### 7. **BELMONTIA** E. Mey.—F.T.A. 4, 1 : 551.

A small annual about 5 cm. high ; stems 4-angled ; leaves ovate or oblong, subacute, 8 mm. long, glabrous ; flowers 1–4 together, on very short erect pedicles ; sepals ovate, 3 mm. long, narrowly winged on the keel ; corolla-tube half as long again as the sepals, lobes obovate, 2 mm. long ; anthers included in the tube, tipped by a gland .. .. .. .. .. .. .. .. .. .. 1. *pumila*

A small annual up to 8 cm. high ; stems ribbed ; leaves linear-lanceolate, acute, about 1 cm. long, glabrous ; flowers solitary or up to 3 to each stem, on long slender pedicels up to 5 cm. long ; sepals elliptic, abruptly long-acuminate, 7–8 mm. long, slightly keeled ; corolla-tube a little longer than the sepals, lobes ovate-rounded, mucronate, 3·5 mm. long ; anthers included in the tube .. .. .. 2. *luteo-alba*

1. **B. pumila** *Baker*—F.T.A. 4, 1 : 552. A small erect herb with pale yellow flowers.
   N. Nigeria : Nupe, Lom, in a swamp ! Exsicc.—*Barter* 1680.
2. **B. luteo-alba** *A. Chev.* in Journ. de Bot. 1909 : 119 ; Chev. Bot. 445.
   French Guinea : Futa-Jallon, various localities ! Exsicc.—*Chev.* 18239, etc.

### 8. **FAROA** Welw.—F.T.A. 4, 1 : 565.

A small herb up to about 5 cm. high ; leaves elliptic to lanceolate, membranous, the basal ones about 2·5 cm. long, the others smaller ; flower-clusters axillary and terminal ; pedicels very short ; calyx-lobes ovate, acute ; corolla-lobes ovate ; capsule as long as the calyx .. .. .. .. .. .. .. .. *pusilla*

**F. pusilla** *Baker*—F.T.A. 4, 1 : 568. Flowers white or greenish, very small.
N. Nigeria : Nupe, in moist sand by a swamp ! Also in E. Sudan. Exsicc.—*Barter* 1008 ; 1710.

### 9. **ENICOSTEMA** Blume—F.T.A. 4, 1 : 563.

A glabrous herb ; leaves sessile, linear to narrowly oblong-lanceolate, acute to obtuse, up to 8 cm. long ; flowers in axillary clusters all along the stem, sessile ; calyx-tube 2 mm. long, lobes ovate-lanceolate to linear-lanceolate, acuminate, 2 mm. long, with spreading tips, margin submembranous ; corolla-tube 5 mm. long ; lobes about 3 mm. long ; capsule oblong .. .. .. .. .. .. .. .. *littorale*

**E. littorale** *Blume*—F.T.A. 4, 1 : 563. Perennial herb woody below, branching sometimes from the base, angled or narrowly winged, with flowers ¼–⅓ in. long white with green lines and centre.
Gambia: swamps on north bank ! In tropical Africa generally, S. Africa and the Eastern tropics. Exsicc.—*Brown-Lester* (no number).

### 10. **VOYRIA** Aubl.—F.T.A. 4, 1 : 569.

Stems slightly zigzag, 1-flowered, up to 6 cm. long, bearing about 3 pairs of very small rudimentary membranous leaves ; calyx 7 mm. long, lobes linear-lanceolate, setaceous at the apex ; corolla-tube 2 cm. long, lobes 5, shortly spathulate-orbicular ; anthers included in the corolla-tube ; capsule elliptic, membranous .. *platypetala*

**V. platypetala** *Baker*—F.T.A. 4, 1 : 570. A tiny herb pale straw-coloured when dry, with solitary terminal yellow or bluish flowers.
S. Nigeria : Nun River (Sept.) ! Exsicc.—*Mann* 514.

### 11. **LIMNANTHEMUM** S. G. Gmel.—F.T.A. 4, 1 : 583.

Leaves ovate-orbicular, deeply cordate at the base, with faint radiating nerves, up to 20 cm. long and 18 cm. broad, thin and glabrous, entire ; petiole about 1 cm. long ; flowers numerous, fasciculate ; pedicels 3–6 cm. long, fairly stout ; sepals ovate-lanceolate ; corolla-tube campanulate, 5–6-lobed ; stamens 5–6 ; ovary 1-celled, with parietal placentas ; seeds compressed-orbicular, finely tuberculate .. *senegalense*

**L. senegalense** *N.E.Br.*—F.T.A. 4, 1 : 586 ; Chev. Bot. 447. *Villarsia senegalensis* G. Don. *L. niloticum* N.E.Br. F.T.A. 4, 1 : 585, partly, not of Kotschy & Peyr. A water plant with broad rounded leaves and white flowers in clusters, the corolla ciliate ; pedicels elongating to 2–3 in. in fruit ; in muddy pools.
Senegal : Richard Tol ! Lake Guier (Jan.) ! Casamance, Séléki (Jan.) ! Gambia ! N. Nigeria : Nupe ! Katagum (Sept.) ! Also in Shari-Chad. Exsicc.—*Roger*. *Leprieur*. *Barter* 1329. *Dalz.* 197. *Pirie* 48.

## 127. PRIMULACEAE

Perennial or annual herbs ; stems erect or procumbent and rooting at the nodes. Leaves mostly basal, rarely cauline, alternate or opposite, simple or variously lobate, often dentate ; stipules absent. Flowers solitary to paniculate, actinomorphic, hermaphrodite. Calyx persistent, often leafy. Corolla tubular, lobes 5, imbricate. Stamens inserted on the corolla, the same number as and opposite the lobes. Ovary superior, rarely semi-inferior, 1-celled, with a free basal placenta and numerous ovules. Fruit a capsule, many-seeded. Seeds angular, with small straight embryo in copious endosperm.

Mostly in the mountainous parts of the north temperate zone, rare in the Southern Hemisphere. Recognised at once amongst the *Gamopetalae* by the united petals with the stamens inserted opposite to them, and the peculiar placentation. *Ardisiandra* is endemic to the mountains of west and east tropical Africa.

Ovary superior :
  Corolla contorted ; erect herb with entire leaves ; capsule opening by a transverse slit 1. **Anagallis**
  Corolla imbricate ; procumbent herb with ovate-orbicular coarsely dentate cordate leaves ; capsule opening by valves.. .. .. .. .. 2. **Ardisiandra**
Ovary inferior or half-inferior ; corolla imbricate ; erect herb with obovate-spathulate entire leaves ; capsule opening by valves .. .. .. .. .. 3. **Samolus**

### 1. **ANAGALLIS** Linn.—F.T.A. 3 : 490.

A small herb ; stems erect, grooved, glabrous ; leaves alternate, obovate-elliptic, subacute, narrowed to the base, about 1 cm. long and 4 mm. broad, glabrous ; flowers solitary, axillary ; pedicels about 5 mm. long, glabrous ; calyx-segments subulate-triangular, acutely acuminate, 2 mm. long ; corolla persistent on top of the capsule, the latter globose, membranous .. .. .. .. .. .. *pumila*

**A. pumila** *Swartz* Prodr. Veg. Ind. Occ. 1 : 40 ; Pax & Knuth in Engl. Pflanzenr. 4 : 331, fig. 71. *A. djalonis* A. Chev. Bot. 384. A slender branched herb 3–10 in. high, with small white flowers.
French Guinea : Futa-Jallon, various localities ! N. Nigeria : Borgu, swamp near River Ohy ! Lokoja, moist places (Nov.) ! Widely spread in the S. Hemisphere, north to Himalaya, and in Florida. Exsicc.—*Barter* 784. *Dalz.* 52. *Chev.* 20193, etc.
**A. arvensis** *Linn.* occurs as a weed of cultivation in oases of the Sahara (Chev. Bot. 384).

### 2. **ARDISIANDRA** Hook. f.—F.T.A. 3 : 488.

A creeping herb with slender stems, the latter rooting at the nodes, pubescent ; leaves suborbicular in outline, cordate at the base, coarsely lobate, lobes toothed, 2·5–3 cm. diam., setulose-pubescent on both surfaces, 5-nerved at the base ; petiole as long or longer than the leaf, pubescent ; flowers up to 3 together, extra-axillary ; pedicels up to about 1 cm. long, pubescent ; calyx-segments ovate-lanceolate, 0·5 cm. long,

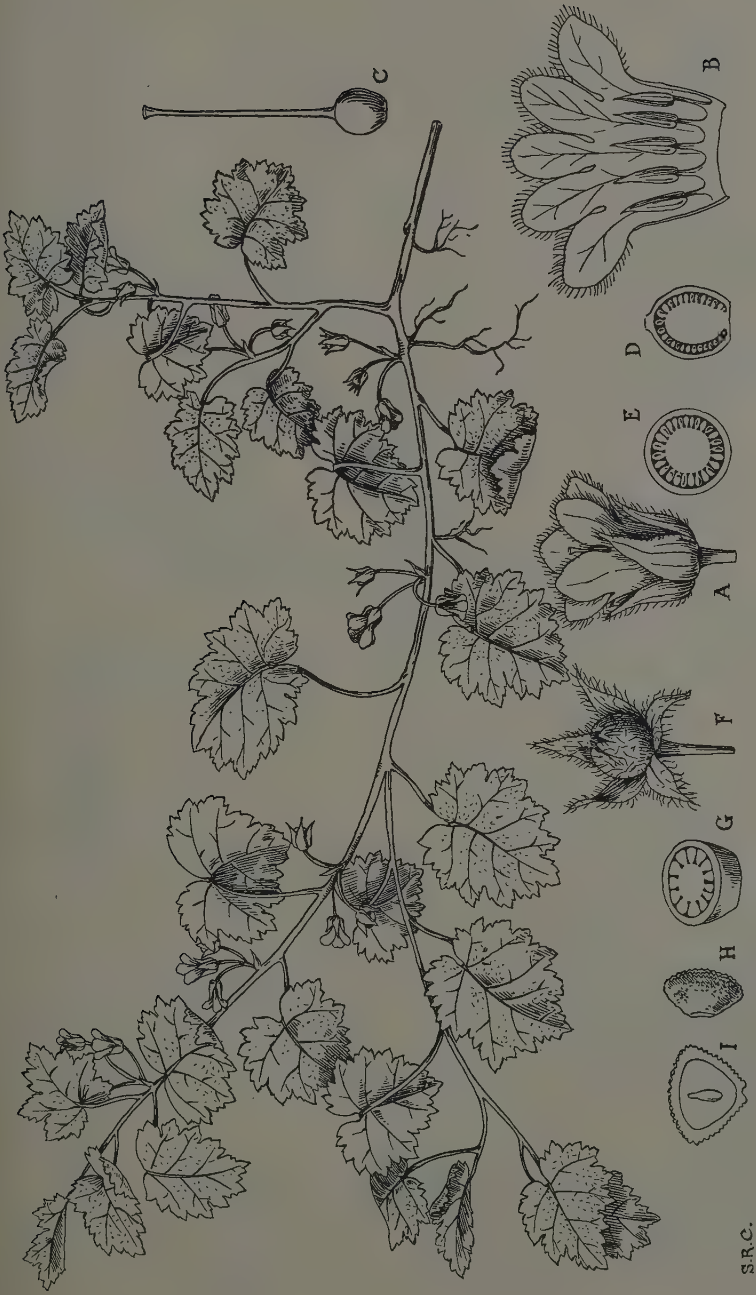

FIG. 237.—ARDISIANDRA SIBTHORPIOIDES *Hook. f.* (PRIMULACEAE).

A, flower. B, corolla laid open. C, pistil. D and E, longitudinal and cross-sections of ovary. F, fruit. G, cross-section of fruit. H, seed. I, cross-section of seed.

ciliate ; corolla campanulate, a little longer than the calyx, shortly 5-lobed, lobes ciliate ; anthers mucronate ; capsule globose, setulose .. .. *sibthorpioides*

**A. sibthorpioides** *Hook. f.*—F.T.A. 3 : 488 ; Pax & Knuth in Engl. Pflanzenr. 4 : 222, fig. 50. Flowers white, ½ in. in diameter.
Cameroons Mt. : Buea, and in forest up to 7,600 ft. (Dec.) ! Fernando Po, 7,500 ft. (Mar.) !
Exsicc.—*Mann* 1458 ; 2022. *Schlechter* 12846. *Diestel* 656. *Maitland* 1021. *Note.*—The East African specimens referred to this differ in having less-toothed leaves, and appear to be distinct.

### 3. SAMOLUS Linn.—F.T.A. 3 : 490.

Herb with ascending stems ; leaves obovate-spathulate, rounded at the apex, entire, up to 8 cm. long and 3 cm. broad, the basal ones often forming a rosette ; flowers in slender terminal racemes ; pedicels up to 1·5 cm. long, with a bract in the middle ; calyx campanulate, 3–4 mm. long, 5-toothed ; corolla campanulate, a little longer than the calyx, 5-lobed .. .. .. .. .. .. .. *Valerandi*

**S. Valerandi** *Linn.*—F.T.A. 3 : 490. A glabrous herb, 2–3 ft. high, with small white flowers.
N. Nigeria : Bornu ! Also in East Africa and Abyssinia, and widely distributed in other parts of the world. Exsicc.—*Denham & Clapperton.*

## 128. PLUMBAGINACEAE

Herbs, undershrubs or climbers. Leaves in a basal rosette or alternate; stipules absent. Flowers hermaphrodite, actinomorphic, often in one-side-inflorescences or subumbellate ; bracts often sheathing, dry and membranous. Calyx often ribbed, mostly membranous between the ribs. Corolla gamopetalous, lobes imbricate, mostly persistent. Stamens 5, opposite the corolla-lobes ; anthers 2-celled, opening lengthwise. Disk absent. Ovary superior, 1-celled ; styles 5, free or connate. Ovule 1, pendulous from a basal funicle. Fruit various. Seed with or without endosperm, and with a straight embryo.

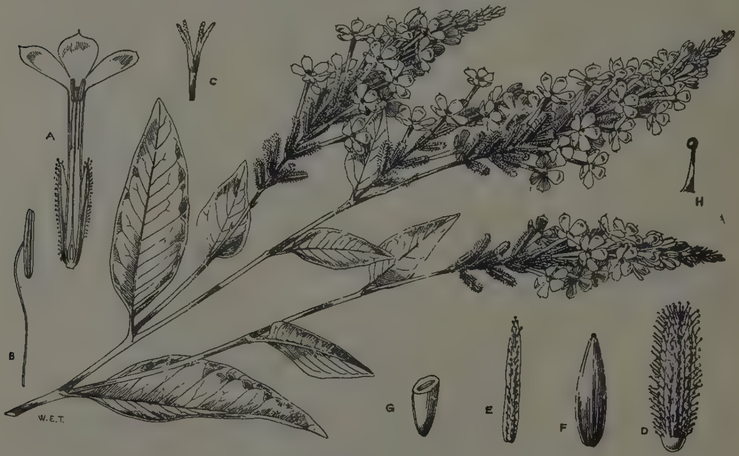

FIG. 238.—PLUMBAGO ZEYLANICA *Linn.* (COMPOSITAE).
A, longitudinal section of flower. B, stamen. C, style arms. D, calyx in fruit. E, sepal. F, fruit. G, cross-section of fruit. H, stalked gland.

Mainly maritime ; numerous around the shores of the Mediterranean ; some highly decorative species.

Climber ; flowers racemose ; calyx tubular, clothed with stalked glands 1. **Plumbago**
Maritime low herbaceous perennials ; flowers cymose ; calyx not glandular 2. **Limonium**

### 1. PLUMBAGO Linn.—F.T.A. 3 : 486.

A climbing undershrub ; branches ribbed, glabrous ; leaves ovate or ovate-lanceolate, acute, shortly cuneate at the base, 6–10 cm. long, 3–6 cm. broad, glabrous ; petiole

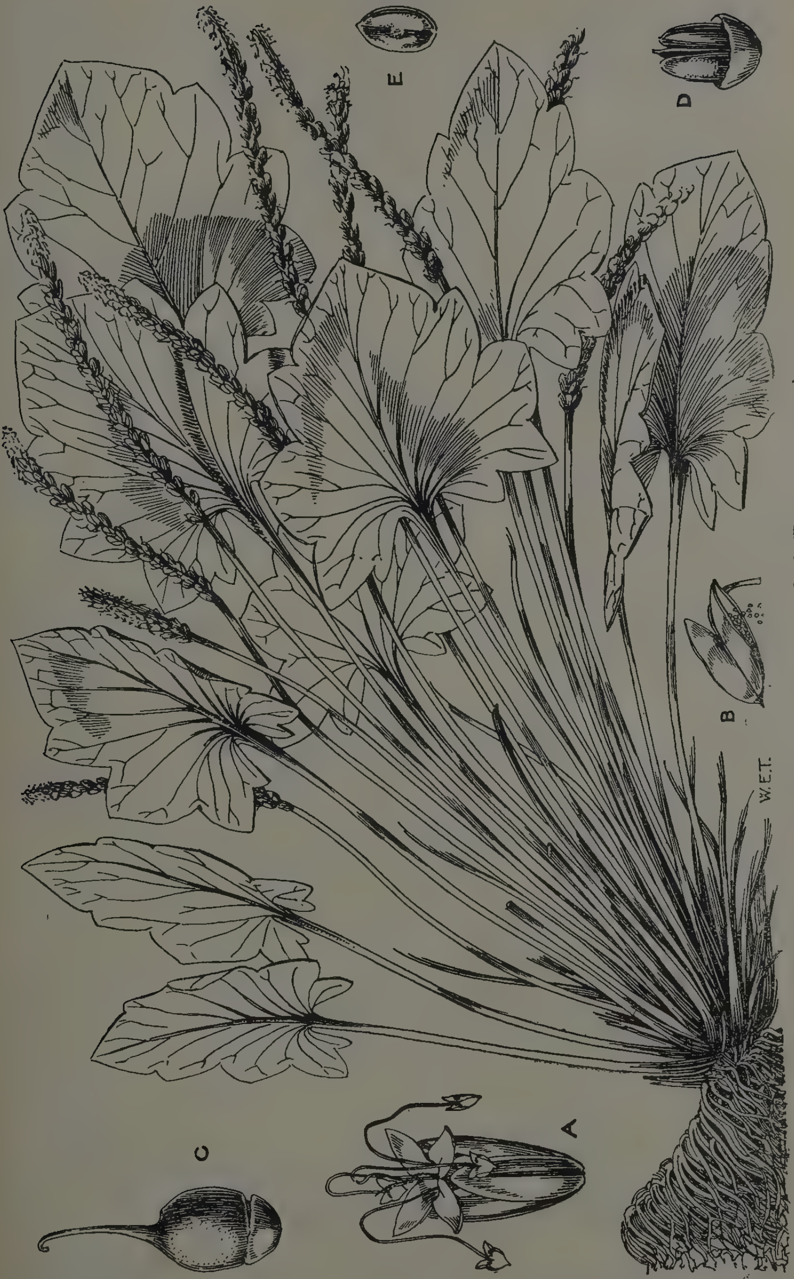

FIG. 239.—PLANTAGO PALMATA *Hook. f.* (PLANTAGINACEAE).
A, flower. B, anther. C, pistil. D, open fruit. E, seed.

amplexicaul at the base ; racemes mostly branched ; calyx about 1 cm. long, clothed with stiff stalked glands ; corolla longer than the calyx ; capsule membranous, included in the persistent calyx .. .. .. .. .. .. *zeylanica*

**P. zeylanica** *Linn.* F.T.A. 3 : 486 ; Holl. 3 : 396 ; Chev. Bot. 383. Flowers white, ¾ in. long. Common in the neighbourhood of villages ! Widely spread in the tropics. (See Appendix).

### 2. LIMONIUM—Adans. Fam. 2 : 283 (1763). (*Statice* Auct.—F.T.A. 3 : 485).

Branchlets of the little-branched inflorescence smooth or very slightly pustulate, curved ; flowers spicately arranged on one side of the axis, about 6 mm. long ; bracts broadly boat-shaped, reddish, with membranous margins ; leaves broadly spathulate, widely emarginate, very glaucous, about 2 cm. long and 3 cm. broad ; petiole 2·5 cm. long 1. *mauritanicum*

Branchlets densely rugose, very numerous ; stem leaves reduced to scales ; flowers clustered, about 4 mm. long ; bracts ovate, very small .. .. 2. *tuberculatum*

1. **L. mauritanicum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Statice pectinata* A. Chev. Bot. 383, not of Ait. Perennial herb erect and spreading from a woody stock with taproot and grey glabrous stem 3–6 in. high.
   Mauritania : Port Etienne—Cape Blanco (Jan.–Mar.) ! N.W. Adrar ! Exsicc.—*De Vilmorin* 18901. *Caille* 25409. *Schmitt* 28522—all ex Herb. Chev.
2. **L. tuberculatum** *O. Kuntze* Rev. Gen. 1 : 399. *Statice tuberculata* Boiss.—F.T.A. 3 ; 485 ; Chev. Bot. 383. Much-branched shrublet of sand-flats, etc.
   Mauritania : Port-Etienne to Cape Blanco and neighbourhood (Feb., Mar.) ! Exsicc.—*Boteler*. *Caille* in *Herb. Chev.* 25408. *Chev.* 25568.

## 129. PLANTAGINACEAE

Herbs. Leaves all radical or alternate or opposite, simple, sometimes much reduced. Flowers usually hermaphrodite, spicate, actinomorphic. Calyx herbaceous. Corolla gamopetalous, scarious, 3–4-lobed, lobes imbricate. Stamens usually 4, inserted on the corolla-tube and alternate with the lobes or hypogynous ; anthers 2-celled, opening lengthwise. Ovary superior, 1–4-celled ; style simple. Ovules 1 or more in each cell, axile or basal. Fruit a circumscissile capsule or nut. Seeds peltately attached, with fleshy endosperm and straight or curved embryo.

A small family represented in our area by one very distinct species.

### PLANTAGO Linn.—F.T.A. 5 : 504.

Herbs with usually radical leaves and long-pedunculate spikes of small flowers ; stamens usually 4 ; anthers versatile ; fruit a circumscissile capsule.

A perennial herb with numerous roots ; leaves all radical, very long-petiolate, ovate-orbicular in outline, widely cordate at the base, coarsely crenately lobed, about 9 cm. diam., with 3 principal nerves and several spreading side nerves, slightly pubescent on the nerves below, gradually narrowed into the petiole ; spikes long-pedunculate, about 2 cm. long in flower, soon lengthening and slender .. .. *palmata*

**P. palmata** *Hook. f.*—F.T.A. 5 : 504.
Cameroons Mt., 7,000 ft. (Dec.) ! Fernando Po, 7,500–8,000 ft. (Dec.) ! Also on the mountains of E. Africa, from Abyssinia to Lake Nyasa. Exsicc.—*Mann* 611 ; 1962.

## 130. CAMPANULACEAE

Herbs to small trees, nearly always with milky juice. Leaves alternate, rarely opposite, simple ; stipules absent. Flowers hermaphrodite, actinomorphic. Calyx-tube adnate to the ovary, 3–10-lobed. Corolla gamopetalous, tubular or campanulate, lobes valvate. Stamens as many as the corolla-lobes and alternate with them, inserted towards the base of the corolla or the disk ; anthers free, 2-celled, opening lengthwise. Ovary inferior or rarely superior, 2–10-celled, with axile placentas. Ovules mostly numerous. Fruit capsular or baccate.

A widely distributed family, in Africa mainly confined to the south. The absence of stipules distinguishes it from the herbaceous *Rubiaceae*.

Capsule opening at the apex by as many valves as there are cells ; flowers not spicate :
  Corolla not divided below the middle, lobes short and broad .. 1. **Wahlenbergia**
  Corolla deeply divided into narrow lobes .. .. .. .. 2. **Cephalostigma**
Capsule opening by a transverse slit ; flowers in dense spikes .. 3. **Sphenoclea**

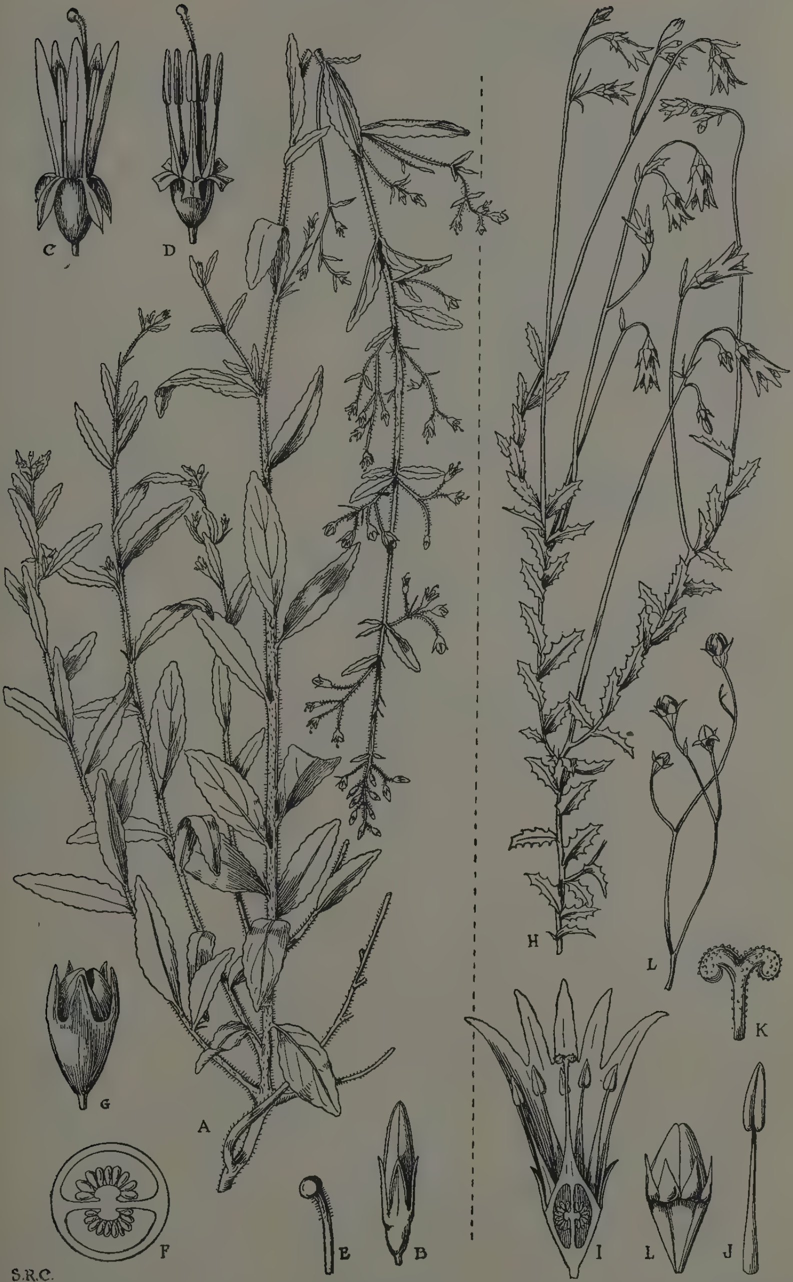

FIG. 240.

A, Cephalostigma Perottetii *A. DC.* B, flower-bud. C, open flower. D, the same with corolla removed. E, stigma. F, cross-section of ovary. G, fruit. H, Wahlenbergia arguta *Hook f.* I, longitudinal section of flower. J, stamen. K, stigmas. L, fruits (Campanulaceae).

## 1. WAHLENBERGIA Schrad.—F.T.A. 3 : 477.

Capsule short, about 4 mm. long, obconic ; leaves lanceolate, about 1 cm. long, coarsely serrate-dentate, more or less pilose ; flowers few on long peduncles ; calyx-lobes triangular-subulate, about 3 mm. long ; corolla about 1 cm. long .. 1. *arguta*
Capsule 1–1·5 cm. long :
  Leaves linear, about 5–6 cm. long, glabrous or pubescent, with a thick cartilaginous crenulate margin ; flowers several in a long-pedunculate cyme ; capsule campanulate-obconic, glabrous .. .. .. .. .. .. .. .. 2. *riparia*
  Leaves lanceolate, about 1 cm. long, sparingly setose-pilose, with a cartilaginous minutely crenulate margin ; flowers very few on long peduncles ; capsule sub-cylindric, about 1·5 cm. long, with several ribs .. .. .. .. 3. *Mannii*

1. **Wahlenbergia arguta** *Hook. f.*—F.T.A. 3 : 478. A slender sparingly branched herb with wiry slightly pilose stems from a hard base, and small pale blue flowers.
Cameroons Mt., grasslands, 7,000–10,000 ft. (Dec.–Feb.) ! Fernando Po, 8,500 ft (Dec.) ! Exsicc.—*Mann* 601 ; 1225 ; 1283 ; 1943 ; 1944. *Johnston* 77. *Dalz.* 8314. *Migeod* 166.

2. **W. riparia** *A.DC.*—F.T.A. 3 : 480 ; Chev. Bot. 382. Erect simple or branched pilose herb 1–2 ft. high, with blue campanulate flowers ; in fields, etc.
French Sudan : Faramana (June) ! Senegal ! N. Nigeria : Nupe ! Abinsi (Oct.) ! Bauchi Plateau : Vom, 3,000–4,500 ft. (Nov.) ! Takwara (May) ! Taura (May) ! Exsicc.—*Leprieur* and *Perrottet. Barter* 1202. *Dalz.* 702. *Lely* 108 ; 120. *Dent Young* 168.

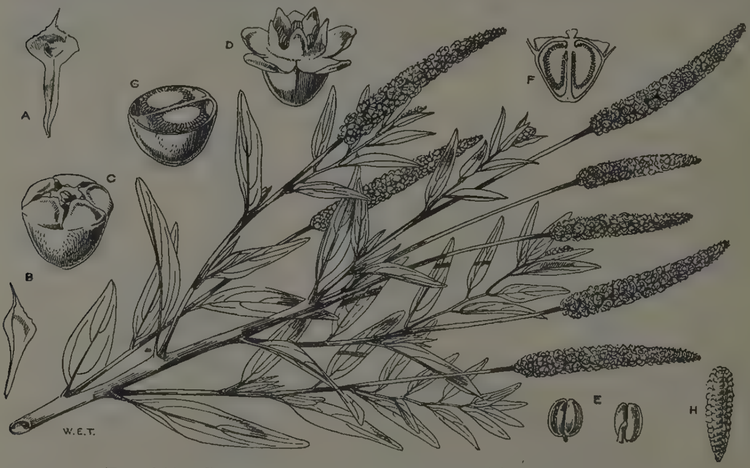

FIG. 241.—SPHENOCLEA ZEYLANICA *Gaertn.* (CAMPANULACEAE).

A and B, bracts. C, flower. D, the same open. E, anthers. F, longitudinal section of ovary. G, transverse section of ovary. H, seed.

3. **W. Mannii** *Vatke*—F.T.A. 3 : 478. A wiry herb like *W. arguta*, white-hispid in the leafy part.
Cameroons Mt., grassland, 7,000–9,000 ft. (Dec.–Feb.) ! Fernando Po, 9,000 ft. (Dec.) ! Exsicc.—*Mann* 600 ; 1226 ; 1945.

*Imperfectly known species.*

**W. Cervicina** A.DC. Prodr. 7 : 440—F.T.A. 3 : 479.
Senegal. Also said to occur in Egypt. Exsicc.—*Leprieur* and *Perrottet.*

## 2. CEPHALOSTIGMA A.DC.—F.T.A. 3 : 471.

Calyx-lobes as long as the ovary, oblong-lanceolate, 2·5 mm. long, with a cartilaginous margin ; ovary pilose with rather stiff white hairs ; stems pilose ; leaves sessile, ovate-lanceolate to oblanceolate, acute, very sparingly setose-pilose, with a thicker recurved cartilaginous margin ; flowers few, forming a leafy cyme ; pedicels slender, about 1 cm. long, thinly pilose ; corolla shorter than the calyx .. 1. *perotifolium*
Calyx-lobes shorter than the ovary :
  Calyx-lobes shortly triangular ; stems sharply angular, hispid-pilose ; leaves oblong-lanceolate, 5–7 mm. long, thinly setose, with cartilaginous margins, minutely pustulate-papillous above ; flowers rather numerous, cymose ; pedicels 1–1·5 cm. long, very slender ; fruit about 3 mm. long .. .. .. .. 2. *ramosissimum*
  Calyx-lobes subulate ; stems more or less terete, pilose to glabrous ; leaves lanceolate, 3–5 cm. long, up to 1·5 cm. broad, thin, with a shallowly crenulate cartilaginous margin ; flowers very numerous, cymules forming an oblong panicle ; pedicels slender, up to 1 cm. long ; fruit nearly 5 mm. long .. .. 3. *Perrottetii*

1. **Cephalostigma perotifolium** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Wahlenbergia perotifolia* Wight & Arn. in Wight Ic. t. 842. *C. hirsutum* Hemsl. F.T.A. 3 : 472, not of Edgw. *C. Schimperi* Hochst. Erect much-branched pilose annual from a few inches to 1 ft. or more high, with bluish flowers ¼ in. long.
   N. Nigeria : Bauchi Plateau, Vom, 3,000–4,500 ft. ! Nabardo (Sept.) ! Extends to India. Exsicc.—*Dent Young* 167. *Lely* 623.
2. **C. ramosissimum** *Hemsl.*—F.T.A. 3 : 472. Erect branched annual, with slender ribbed hispid stems 3–6 in. high and very small blue flowers.
   Cameroons Mt., grasslands, 7,000 ft. (Nov., Dec.) ! Exsicc.—*Mann* 1333 ; 1992.
3. **C. Perrottetii** *A.DC.*—F.T.A. 3 : 472 ; Stapf 615 ; Chev. Bot. 382. *C. Prieurei* A.DC. *C. Diaguissae* A. Chev. Bot. 382. Erect usually branched annual 1–2 ft. or more high, pilose below becoming glabrous in the upper parts, with very small lilac flowers.
   Senegal to N. and S. Nigeria, a common weed ! Extends to Congo and S. Tropical Africa ; also in Comoro Islands and tropical S. America. Exsicc.—*Perrottet* and *Leprieur*. *Heudelot* 554. *Barter* 826. *Sc. Elliot* 4127. *Smythe* 129. *Chipp* 68. *Dalz.* 58 ; 707. *Dawodu* 363. *Pobéguin* 466. *Krause*. *Schroeder* 117. *Chev.* 18868 ; 18881.

### 3. **SPHENOCLEA** Gaertn.—F.T.A. 3 : 480.

Leaves lanceolate, more or less acute, up to 10 cm. long and 3 cm. broad, entire, glabrous ; petiole up to 1·3 cm. long ; spikes terminal, cylindric, up to 7 cm. long, about 1 cm. diam. ; calyx-lobes ovate-rounded, imbricate ; corolla divided nearly to the base, as long as the calyx ; anthers 5, subsessile, suborbicular ; style very short ; stigma shortly bifid ; capsule depressed-globose, dehiscing transversely .. .. 1. *zeylanica*

Leaves obovate-elliptic, sessile, rounded at the apex, 2–4 cm. long, 1–2 cm. broad ; spikes very short, oblong ; corolla twice as long as the calyx-lobes ; filaments as long as the anthers .. .. .. .. .. .. .. .. .. 2. *Dalzielii*

1. **S. zeylanica** *Gaertn.*—F.T.A. 3 : 481 ; Chev. Bot. 382. An erect glabrous herb with spongy stems, 1–4 ft. high, and greenish-white flowers in dense bracteate spikes 1–3 in. long ; habitat in stagnant water, rice-fields, etc.
   Senegal to N. and S. Nigeria ! S. Nigeria : Lagos, Ikoyi, etc. ! Cameroons R. ! In the tropics generally. Exsicc.—*Barter* 1715. *Mann*. *Rowland*. *Sc. Elliot* 5924. *Farmar* 118. *Dalz.* 68 ; 383 ; 1350. *Lely* 663. *Deighton* 965.
2. **S. Dalzielii** *N.E.Br.* in Kew Bull. 1912 : 277. Erect or ascending herb of muddy pools, with whitish flowers, probably an aquatic form of the preceding.
   N. Nigeria : Katagum (Sept.) ! Also in Shari-Chad. Exsicc.—*Dalz.* 201.

## 131. LOBELIACEAE

Characters of *Campanulaceae* (p. 188), but corolla zygomorphic and anthers cohering into a tube around the style.

Mainly tropics and subtropics ; some remarkable species of *Lobelia* in the African mountains, especially in East Africa, where they are a prominent feature of the vegetation.

### **LOBELIA** Linn.—F.T.A. 3 : 464.

Tall stiff herbs or small and often creeping ; corolla zygomorphic ; anthers connate and often pubescent.

Tall stiff herbaceous plant about 2 m. high ; stems softly tomentellous ; leaves sessile, lanceolate, acute, up to 20 cm. long and 3 cm. broad, softly and shortly pubescent on both surfaces, with numerous lateral nerves ; flowers in a dense terminal raceme 20–25 cm. long ; bracts linear-lanceolate, nearly as long as the flowers ; corolla about 3·5 cm. long, tomentellous .. .. .. .. .. 1. *columnaris*

Small and weak herbs :

Leaves suborbicular, coarsely dentate, nearly 1 cm. diam., glabrous, tinged with purple below ; petiole about 4 mm. long ; flowers axillary, solitary ; pedicel 1–2 cm. long, slender ; calyx-lobes linear-lanceolate, 2·5 mm. long ; corolla about 5 mm. long ; anthers pubescent ; ovary thinly pilose .. .. .. .. 2. *acutidens*

Leaves ovate or elliptic to linear :

Lower leaves ovate-elliptic :

Leaves coarsely serrate, 3·5–6·5 cm. long, 2–3 cm. broad, sparsely setose above, glabrous below ; petiole winged, 1–2 cm. long ; flowers 2–3 together, subsessile ; ovary elongated, about 1 cm. long, glabrous ; calyx-lobes linear, 1·5 mm. long ; corolla 1 cm. long ; fruit splitting up into long stramineous segments up to 2·5 cm. long .. .. .. .. .. .. .. .. .. 3. *galeopsoides*

Leaves serrulate, subacute, cuneate into the winged petiole at the base, 2–2·5 cm. long, 0·8–1 cm. broad, serrulate, glabrous ; flowers as above but calyx-lobes linear, 5 mm. long and corolla 7 mm. long ; ovary glabrous outside 4. *kamerunensis*

Lower leaves oblong-linear or lanceolate, sessile or nearly so :

Pedicels elongated, about 2·5–3 cm. long ; leaves narrowly lanceolate, acute, sessile, 2–3 cm. long, 0·4–0·7 cm. broad, denticulate, glabrous ; ovary glabrous ; calyx-lobes linear-subulate, 2·5 mm. long ; corolla 4–5 mm. long .. 5. *baoulensis*

Pedicels up to about 1 cm. long :

Flowers axillary ; leaves narrowly lanceolate, acute at the apex, narrowed to the

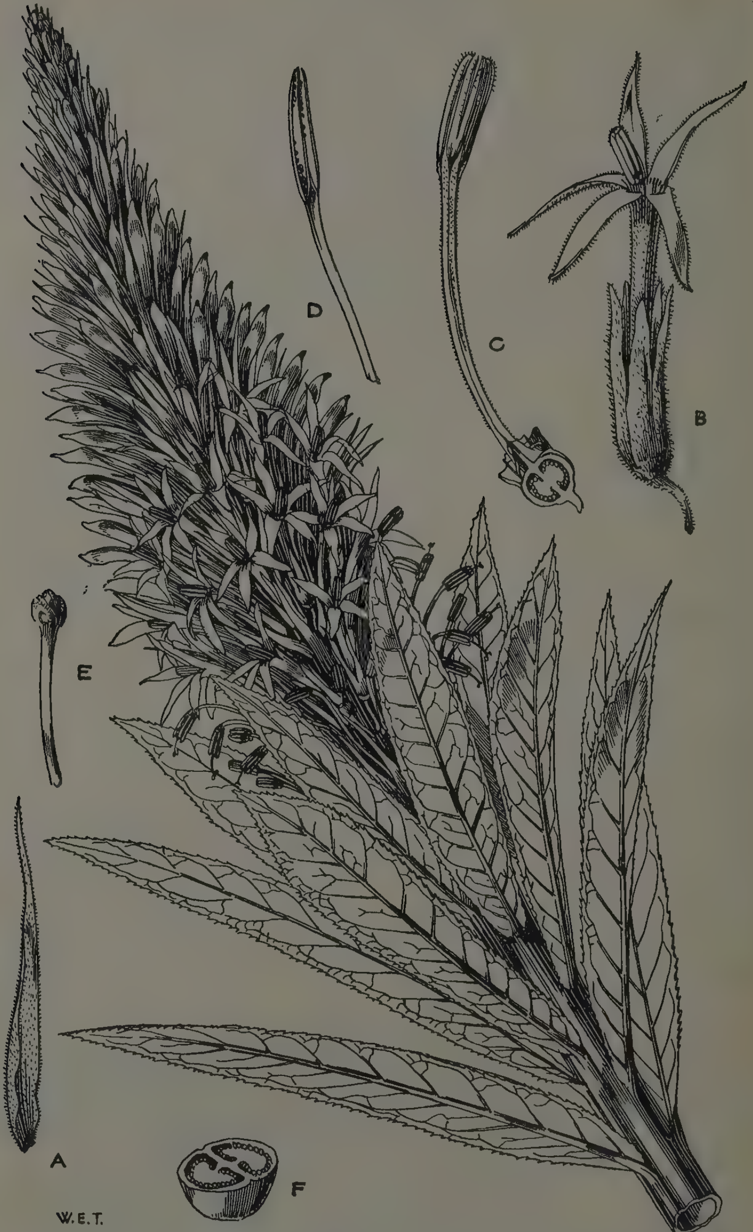

FIG. 242.—LOBELIA COLUMNARIS *Hook. f.* (LOBELIACEAE).
A, bract. B, flower. C, longitudinal section of flower. D, anther. E, stigma. F, cross-section of ovary.

base, 2–3·5 cm. long, 5–7 mm. broad, minutely denticulate, glabrous ; ovary glabrous, nervose ; calyx-lobes linear, 2·5 mm. long ; corolla about 7 mm. long 6. *fervens*

Flowers about 2–3 in a small terminal inflorescence ; leaves linear, rounded and slightly mucronate at the apex, about 3 cm. long and 3–4 mm. broad, finely denticulate, glabrous ; ovary glabrous ; calyx-lobes subulate, 2 mm. long ; corolla about 1 cm. long .. .. .. .. .. .. .. 7. *senegalensis*

1. **Lobelia columnaris** *Hook. f.*—F.T.A. 3 : 466. Erect herb 6 ft. high with the habit of a foxglove, with yellow or blue flowers.
   Cameroons Mt., grasslands, 7,000–9,000 ft. (Jan.–Feb.) ! Fernando Po, Clarence Peak ! Exsicc.—*Mann* 1316 ; *Mildbraed* 10836. *Maitland* 982. *Migeod* 360.
2. **L. acutidens** *Hook. f.*—F.T.A. 3 : 467. Prostrate herb with wiry stems, half-woody at the base, almost glabrous, with blue flowers ⅓–½ in. long.
   Fernando Po, 9,000 ft. (Mar.) ! Apparently also on Kilimanjaro but the material is not quite sufficient to decide the question. Exsicc.—*Mann* 1452.
3. **L. galeopsoides** *Engl. & Diels* in Engl. Bot. Jahrb. 26 : 118. A creeping weak-stemmed herb with thin leaves and blue-purple flowers about ½ in. long.
   S. Nigeria : Oban ! Barombi Valley and neighbourhood (May) ! Also in French Cameroons. Exsicc.—*Talb.* 1259. *Preuss* 184.
4. **L. kamerunensis** *Engl.* ms. A weak prostrate herb, glabrous, with pale bluish flowers ⅓–½ in. long.
   Cameroons Mt. ; ? locality ! Exsicc.—*Preuss* 748.
5. **L. baoulensis** *A. Chev.* Bot. 381. Suberect or decumbent herb, a few inches to 1 ft., with small blue flowers ¼ in. or more long.
   French Guinea : Grandes-Chutes (Dec.) ! Ivory Coast : Baoule-Nord, Middle Nzi Valley, in marsh (Aug.) ! Baoule-Sud, Toumodi (Aug.) ! N. Nigeria : Lokoja (Oct.) ! Kontagora (Nov.) ! Borgu ! Exsicc.—*Dalz.* 59. *Barter* 797. *Chev.* 20313 ; 22252 ; 22389 bis.
6. **L. fervens** *Thunb.*—F.T.A. 3 : 468. A glabrous herb, erect or ascending 12–18 in. high, with pale blue flowers ⅓ in. long.
   Cameroons Mt. : Buea ! In tropical Africa generally and in S. Africa. Exsicc.—*Deistel* 652.
7. **L. senegalensis** *A.DC.*—F.T.A. 3 : 469. A glabrous erect herb about 1 ft. high, branched from the base, with bluish flowers ⅓–½ in. long.
   Senegal : ? locality ! Exsicc.—*Sieber* 15.

## 132. GOODENIACEAE

Herbs or undershrubs. Leaves alternate or rarely opposite ; stipules absent. Flowers zygomorphic. Calyx tubular, adnate to the ovary, rarely free. Corolla gamopetalous, bilabiate or rarely 1-lipped, lobes valvate, often induplicate. Stamens 5, alternate with the corolla-lobes, free or rarely shortly adnate to the corolla ; anthers 2-celled, free or connivent around the style. Ovary mostly inferior, 1–4-celled ; stigma indusiate at the top. Ovules 1 or more in each cell, erect or ascending. Fruit drupaceous or nut-like, or capsular. Seeds small, with straight embryo in the middle of copious endosperm.

Mainly Australian ; represented in our area by one widely distributed species.

### SCAEVOLA Linn.—F.T.A. 3 : 462.

A woody herb up to 50 cm. high, rooting at the base ; leaf-scars oblique, prominent ; leaves narrowly obovate, fleshy, rounded at the apex, broadly petiolate, 5–8 cm. long, 2·5–4 cm. broad, glabrous, faintly nerved when dry ; flowers in short axillary cymes, sessile ; bracts linear ; calyx very short and annular ; corolla about 2 cm. long, glabrous outside, densely woolly inside ; style pubescent, indusiate stigma finely ciliate ; fruit fleshy, about 1·3 cm. long, ellipsoid-globose .. .. *Plumieri*

**S. Plumieri** *Vahl* Symb. Bot. 2 : 36. *Lobelia Plumieri* Linn. *S. Lobelia* Murr.—F.T.A. 3 : 462. A low shrub 1–3 ft. high, succulent and nearly glabrous, with thick branchlets marked by leaf-scars, and white or yellowish flowers ¾ in. long and blue fruits.
On the African sea coast ! Also in tropical America and South India. Exsicc.—*Sieber* 23. *Leprieur* *T. Vogel* 116. *Moloney*. *Chipp* 283. *Irvine* 948. *Deighton* 2044.

## 133. HYDROPHYLLACEAE

Annual or perennial herbs. Leaves radical or alternate, rarely opposite, entire to pinnately or palmately lobed. Flowers usually cymose, hermaphrodite, actinomorphic. Calyx-segments 5, imbricate. Corolla gamopetalous, lobes imbricate or contorted. Stamens the same number as the corolla-lobes and alternate with them, mostly inserted towards the base of the tube ; anthers 2-celled. Ovary superior, 1-celled with 2 parietal placentas, or 2–3-celled ; styles 1 or 2. Ovules numerous. Fruit a loculicidal or rarely septicidal capsule. Seeds with fleshy endosperm and small straight embryo.

Mainly North American.

### **HYDROLEA** Linn.—F.T.A. 4, 2 : 2.

Herbs ; leaves alternate, entire, narrow. Flowers blue, in axillary clusters, or in terminal cymes. Sepals 5, free to near the base, imbricate. Corolla 5-lobed to near the base, open. Stamens 5 ; anthers sagittate. Ovary 2- (rarely 3-) celled ; ovules numerous ; styles 2, divergent. Capsule septicidally 2-valved.

Flowers in axillary clusters along the stems or in very short axillary racemes ; leaves lanceolate, very acutely acuminate, acute at the base, 4–8 cm. long, 1–1·5 cm. broad, glabrous, with numerous lateral nerves ; sepals oblong-lanceolate, acute, glabrous, about 6 mm. long ; corolla lobed nearly to the base, very short ; capsule broadly ovoid, glabrous.. .. .. .. .. .. .. .. 1. *guineensis*

Flowers in cymes ; leaves linear or linear-lanceolate :

Sepals cordate-ovate, about 7 mm. long ; cymes lax, few-flowered ; pedicels slender ; leaves sessile, linear-lanceolate, acute, 2–5 cm. long, 0·5–1 cm. broad, glabrous, with very few lateral nerves ; capsule subglobose, hidden by the slightly accrescent veiny sepals .. .. .. .. .. .. .. .. .. 2. *macrosepala*

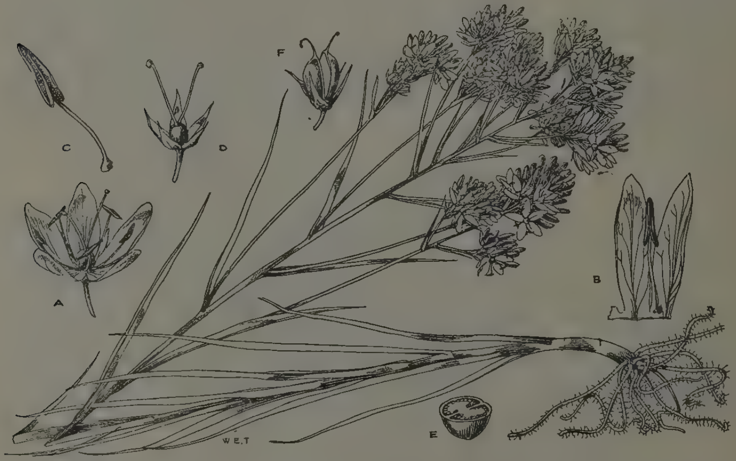

FIG. 243.—HYDROLEA GRAMINIFOLIA *A. W. Benn.* (HYDROPHYLLACEAE).

A, flower. B, part of corolla from inside. C, stamen. D, calyx and pistil. E, cross-section of ovary. F, fruit.

Sepals lanceolate, 4 mm. long ; cymes rather compact, many-flowered ; leaves linear, up to 9 cm. long, acute, glabrous ; capsule globose, about 4 mm. diam., glabrous 3. *graminifolia*

1. **Hydrolea guineensis** *Choisy*—F.T.A. 4, 2 : 3 ; Stapf 632 ; Chev. Bot. 447. Glabrous herb with spongy stems ascending or erect, rooting at the lower nodes, with bright blue flowers opening in the afternoon ; by swamps, etc.

Senegal ! Sierra Leone : several localities ! Liberia : Monrovia ! Ivory Coast : Blérion, at mouth of Cavally ! Tépo country, between Grabo and Taté ! Gold Coast : ? locality. N. Nigeria : Lokoja (Oct.) ! Kontagora (Dec.) ! S. Nigeria : Abeokuta ! Abo ! Extends to Cameroons and Congo. Exsicc.—*Heudelot* ? 79. *Barter* 185. *Irving* 46. *Sc. Elliot* 5805. *Whyte. Dalz.* 56 ; 217. *N. W. Thomas* 735 ; 9943. *Deighton* 1040 ; 1207.

2. **H. macrosepala** *A. W. Bennett*—F.T.A. 4, 2 : 4. *H. djalonensis* A. Chev. Bot. 447. Erect branched glabrous herb the stems spongy in the lower part, up to 2 ft. high, with blue flowers in a very lax paniculate cyme ; by swamps, etc.

French Guinea : Kouroussa (Dec.) ! Kouria and environs (Nov.) ! N. Nigeria : Nupe ! Kontagora and Lokoja (Nov.) ! Also in E. Sudan. Exsicc.—*Barter* 902. *Dalz.* 54. *Pobéguin* 612. *Caille* ex *Herb. Chev.* 14962.

3. **H. graminifolia** *A. W. Bennett*—F.T.A. 4, 2 : 5 ; Chev. Bot. 447. Erect, simple, but branched at the inflorescence, glabrous, stems spongy below, up to 3 ft. or more high, with gentian-blue flowers in a corymb ; by swamps, etc.

French Sudan : Tiguiberri (Jan.) ! French Guinea : Kebeya (June) ! Férédougoua R., Beyla (July) ! Kollangui (Mar.) ! Sierra Leone : Erimakuna (Mar.) ! Ivory Coast : Baoulé-Nord, Nzi (Aug.) ! Gold Coast : ? locality ! Ejura to Yeji (Apr.) ! N. Nigeria : Jebba ! Kontagora (Nov.) ! Abinsi (June) ! Extends to N. Cameroons and E. Sudan. Exsicc.—*Barter* 888. *Sc. Elliot* 5235. *Dalz.* 55 ; 750 (Nigeria) ; 48 (Gold Coast). *Anderson. Collenette* 69. *Pobéguin* 717.

# 134. BORAGINACEAE

Trees, shrubs or herbs, the latter often roughly scabrid or hispid. Leaves alternate or rarely opposite, simple ; stipules absent. Flowers often in scorpioid cymes, actinomorphic or rarely oblique, mostly hermaphrodite. Calyx-lobes imbricate or rarely valvate. Corolla with contorted or imbricate lobes. Stamens the same number as the corolla-lobes and alternate with them, inserted on the corolla. Anthers 2-celled, opening lengthwise. Disk present or absent. Ovary superior, 2-celled or 4-celled by spurious septa, entire or deeply 4-lobed ; style terminal or gynobasic. Ovules paired, erect or spreading from the central axis. Fruit a drupe or of 4 nutlets. Seeds with or without endosperm.

Generally distributed ; very numerous in the dryer parts of the Mediterranean regions. Recognised by the usually rough hairs and often lobed ovary with gynobasic style.

- Style terminal on top of the ovary (ovary not vertically lobed) :
  - Trees or shrubs :
    - Style once divided :
      - Stamens inserted at the throat of the corolla-tube ; flowers small, cymose 1. **Ehretia**
      - Stamens inserted at the bottom of the corolla-tube ; flowers few, in leafy cymes 2. **Rotula**
    - Style twice divided .. .. .. .. .. .. .. .. 3. **Cordia**
  - Herbs :
    - Styles two, separate ; annual procumbent herb densely setose all over ; flowers solitary, axillary .. .. .. .. .. .. .. .. 4. **Coldenia**
    - Style one ; herbs with scorpiod cymes .. .. .. .. 5. **Heliotropium**
- Style inserted between the lobes of the ovary (ovary vertically lobed) :
  - Calyx large and conspicuous, accrescent in fruit .. .. .. 6. **Trichodesma**
  - Calyx rather small, not or only slightly accrescent :
    - Nutlets depressed-globose, covered with glochidiate bristles .. 7. **Cynoglossum**
    - Nutlets ovoid, without glochidiate bristles :
      - Corolla-tube rather long and narrow ; plants densely hispid with long stiff white hairs ; cymes scorpioid ; style bifid .. .. .. .. .. 8. **Arnebia**
      - Corolla-tube not very narrow or plants not very densely hispid ; style simple or nearly so :
        - Flowers solitary, axillary .. .. .. .. .. .. 9. **Leurocline**
        - Flowers cymose :
          - Corolla-lobes imbricate .. .. .. .. .. .. 10. **Lithospermum**
          - Corolla-lobes contorted, patent .. .. .. .. .. 11. **Myosotis**

## 1. EHRETIA Linn.—F.T.A. 4, 2 : 19.

Leaves glabrous below except sometimes on the nerves, broadly elliptic to obovate or almost suborbicular, abruptly acuminate, rounded to subacute at the base, up to 15 cm. long and 10 cm. broad, entire ; petiole 1–2 cm. long, slightly pilose ; cymes large, terminal, many-flowered, shortly pubescent ; flowers small ; calyx-lobes shortly ciliate ; corolla-lobes reflexed ; fruit ovoid-globose, apiculate 1. *cymosa*

Leaves shortly setulose with broad-based hairs on the lower surface, obovate-elliptic, gradually acuminate, rounded at the base, 12–16 cm. long, 5–8 cm. broad, with about 5-6 pairs of lateral nerves ; petiole extremely short ; cymes few-flowered ; calyx-segments linear-lanceolate, glabrous ; fruit narrowly obovoid, ribbed, 1 cm. long 2. *trachyphylla*

1. **E. cymosa** *Thonn.*—F.T.A. 4, 2 : 25 ; Stapf 634 ; Chev. Bot. 449. A shrub or small tree up to 20 ft. high, sometimes with weak drooping branches ; flowers small, white, in copious panicled cymes ; berries red.
   Common from Sierra Leone to Cameroons ! Also in Prince's Island. Exsicc.—*T. Vogel* 20. *Barter* 287 ; 3388. *Irving* 52 ; 139. *Rowland*. *Sc. Elliot* 4856 ; 4920 ; 5645 ; 5723. *Millen* 98. *Brown* 372. *Johnson* 607. *Talb.* 3839. *Warnecke* 82 ; 370. (See Appendix).
2. **E. trachyphylla** *C. H. Wright* in Kew Bull. 1907 : 53. A small tree with lenticellate branches, and small white flowers in lax pubescent cymes.
   Gold Coast : Aburi (June) ! Exsicc.—*Johnson* 974.

## 2. ROTULA Lour. Fl. Cochinch. 121 (1790). (*Rhabdia* Mart.—F.T.A. 4, 2 : 27).

Shrub with numerous setose to glabrescent branchlets ; leaves oblanceolate, up to 3·5 cm. long and 1 cm. broad, rather long-setose-pilose to almost glabrous below ; corymbs lax, lateral ; bracts foliaceous ; calyx-segments linear-oblong, 5 mm. long ; corolla widely campanulate, 1 cm. long, throat glabrous ; stamens included ; fruit slightly ribbed, ovoid, surrounded by the persistent calyx .. .. .. .. *aquatica*

**R. aquatica** *Lour.* l.c. *Rhabdia lycioides* Mart.—F.T.A. 4, 2 : 28 ; Chev. Bot. 449. *Zombiana africana* Baill.—F.T.A. 5 : 263. A stiff-branched shrub 3–6 ft. high, with red flowers ; by streams or half-submerged.

French Sudan: Badumbé (Dec.)! Quignaba (Jan.)! Kéniégué (Jan.). Senegal: Mbidjem! French Guinea: Farana, in bed of Niger (Mar., May)! Sierra Leone: Kukuna, common (Jan.)! Makump! S. Nigeria: Yoruba country, R. Awon! Also in tropical Asia and America. Exsicc.—*Heudelot* 116. *Thierry* 217. *Barter* 1143. *Sc. Elliot* 4718; 5339. *Glanville* 137.

### 3. **CORDIA** Linn.—F.T.A. 4, 2 : 6.

Leaves opposite or subopposite, oblong-oblanceolate, rounded at the apex, 4–8 cm. long, 1·5–3 cm. broad, slightly scabridulous above, finely reticulate below; petiole 0·5–1 cm. long; flowers few; pedicels 5 mm. long; calyx 5 mm. long, slightly setulose; fruit acute, 1 cm. long .. .. .. .. .. .. .. 1. *Gharaf*

Leaves alternate:

Leaves glabrous on the lower surface:

Calyx-tube not ribbed, contracted at the base, about 7 mm. long, glabrous; leaves long-petiolate, oblong to narrowly ovate, acutely acuminate, very shortly cuneate at the base, 8–15 cm. long, 3–6 cm. broad, with about 5 pairs of lateral nerves; fruit 1·5 cm. long, acute .. .. .. .. .. .. 2. *Heudelotii*

Calyx-tube strongly ribbed, 1 cm. long, velvety-tomentellous; corolla shortly exserted, lobes reflexed; leaves elliptic or ovate-elliptic, acutely acuminate, rounded at the base, 10–25 cm. long, 5–10 cm. broad, with about 5 pairs of lateral nerves; petiole 2 cm. long.. .. .. .. .. .. 3. *aurantiaca*

Leaves pubescent to tomentose below:

Calyx very strongly ribbed:

Calyx 1·3 cm. long, appressed-setulose; corolla shortly exserted; branchlets densely pilose; leaves oblong-lanceolate, broadly acuminate, about 20 cm. long and 5 cm. broad, long-pilose on the midrib on both surfaces; petiole 1 cm. long 4. *Vignei*

Calyx less than 1 cm. long, tomentellous; corolla long-exserted, funnel-shaped, about 2·5 cm. long; leaves ovate-orbicular, rounded to widely cordate at the base, rounded at the apex, about 8 cm. diam., with very prominent parallel tertiary nerves, shortly tomentellous below; cymes many-flowered; fruit 1·3–1·5 cm. long, fleshy .. .. .. .. .. .. .. .. 5. *abyssinica*

Calyx not ribbed or only very obscurely so:

Calyx glabrous outside or minutely puberulous only towards the tip, contracted at the base and widely obconic; cymes about 8 cm. long; pedicels very short and stout; leaves ovate-orbicular, slightly and broadly mucronate, slightly pubescent on the closely reticulate lower surface, flabellately trinerved at the base, 6–12 cm. long, 4–9 cm. broad .. .. .. .. .. .. .. 6. *Myxa*

Calyx tomentose or tomentellous outside:

Leaves rounded at the apex; calyx apiculate in bud:

Filaments of the stamens pubescent below their insertion:

Leaves small, at most 7–8 cm. diam., orbicular or obovate-elliptic, entire or denticulate; cymes short and dense-flowered .. .. .. 7. *Johnsonii*

Leaves large, 15–25 cm. long, obovate-orbicular, rounded to deeply cordate at the base, entire or crenulate, softly but thinly tomentose-pilose below, with prominent nerves; cymes with long straggling branches and crowded flowers; fruits narrowly ellipsoid, 4 cm. long .. .. .. .. .. 8. *Millenii*

Filaments glabrous; leaves as in *C. platythyrsa* .. .. 10. *chrysocarpa*

Leaves acuminate; calyx not apiculate in bud, about 7 mm. long; leaf-blade broadly ovate-elliptic, rounded to slightly cuneate at the base, up to 18 cm. long and 12 cm. broad, shortly pubescent below, with prominent and numerous parallel tertiary nerves; cymes divaricate .. .. .. 9. *platythyrsa*

1. **Cordia Gharaf** *Ehrenb.* ex *Aschers.* in Sitz.-ber. Naturf. Fr. Berlin 1879 : 46. *Cornus Gharaf* Forsk. *Cordia senegalensis* Juss. and var. *Pelida* DC. *Cordia Rothii* Roem. & Schult.—F.T.A. 4, 2 : 18; Holl. 3 : 471; Chev. Bot. 448. A shrub or small tree up to 16 ft., with white flowers ¼ in. long in rather small pubescent cymes, and ovoid, pointed fruits on a saucer-shaped calyx.

French Sudan: Tacadji! Timbuktu! Senegal: Walo, etc. (Jan., Feb.)! Gold Coast: Winnebah Plain (fr. Feb.)! Accra (Jan., planted)! Togo: Lome! N. Nigeria: Bornu, Yo (Dec.)! In tropical Africa generally and through Arabia to India. Exsicc.—*Perrottet* 131; 158; 544. *Elliott* 149. *Dalz.* 6 (Gold Coast); 8275. *Warnecke* 344. *Chev.* 3179; 3547.

2. **C. Heudelotii** *Baker*—F.T.A. 4, 2 : 14. *C. Mannii* Baker. *C. syringaefolia* Baker. *Vitex syringaefolia* Baker. A nearly glabrous shrub or tree up to 30 ft. high, with white flowers ⅓ in. long in lax terminal and axillary cymes.

Senegal! Gold Coast: Juaso (Feb.)! S. Nigeria: Lagos Colony, in forests! Ambas Bay (Feb.)! Johann-Albrechtshöhe! Also in French Cameroons. Exsicc.—*Heudelot*. *Barter* 3425. *Mann* 768. *Rowland*. *Staudt* 614. *Vigne* 1820.

3. **C. aurantiaca** *Baker*—F.T.A. 4, 2 : 10. *C. Zenkeri* Gürke. *C. Dusenii* Gürke. A shrub or small tree 15–25 ft. high, brownish-velvety on the young parts, with orange-yellow flowers ¾ in. long in terminal cymes.

S. Nigeria: Idumuye (Dec.)! Oban! Cameroons Mt.: Buea! Victoria! Fernando Po (June, Dec.)! Extends to Gabon and Lower Congo. Exsicc.—*Barter* (no number). *Mann* 4. *N. W. Thomas* 2103; 2140. *Talb.* 318. *Deistel* 620. *Dusen* 359a. *Preuss* 1256.

4. **C. Vignei** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. A shrub with rather long acutely-pointed leaves, densely pale brown pubescent on the young parts, with flowers ½–⅔ in. long.

Gold Coast: Kumasi, in closed forest (Apr.)! Exsicc.—*Vigne* 1098.

5. **C. abyssinica** *R.Br.*—F.T.A. 4, 2 : 8; Holl. 3 : 469; Lely 41. *C. platythyrsa* A. Chev. Bot. 448, not of Baker. A shrub or small tree up to 25 ft. high, with broad leaves strongly-nerved below, conspicuous funnel-shaped white flowers in paniculate cymes, and yellow succulent fruits ⅓–½ in. in diameter.

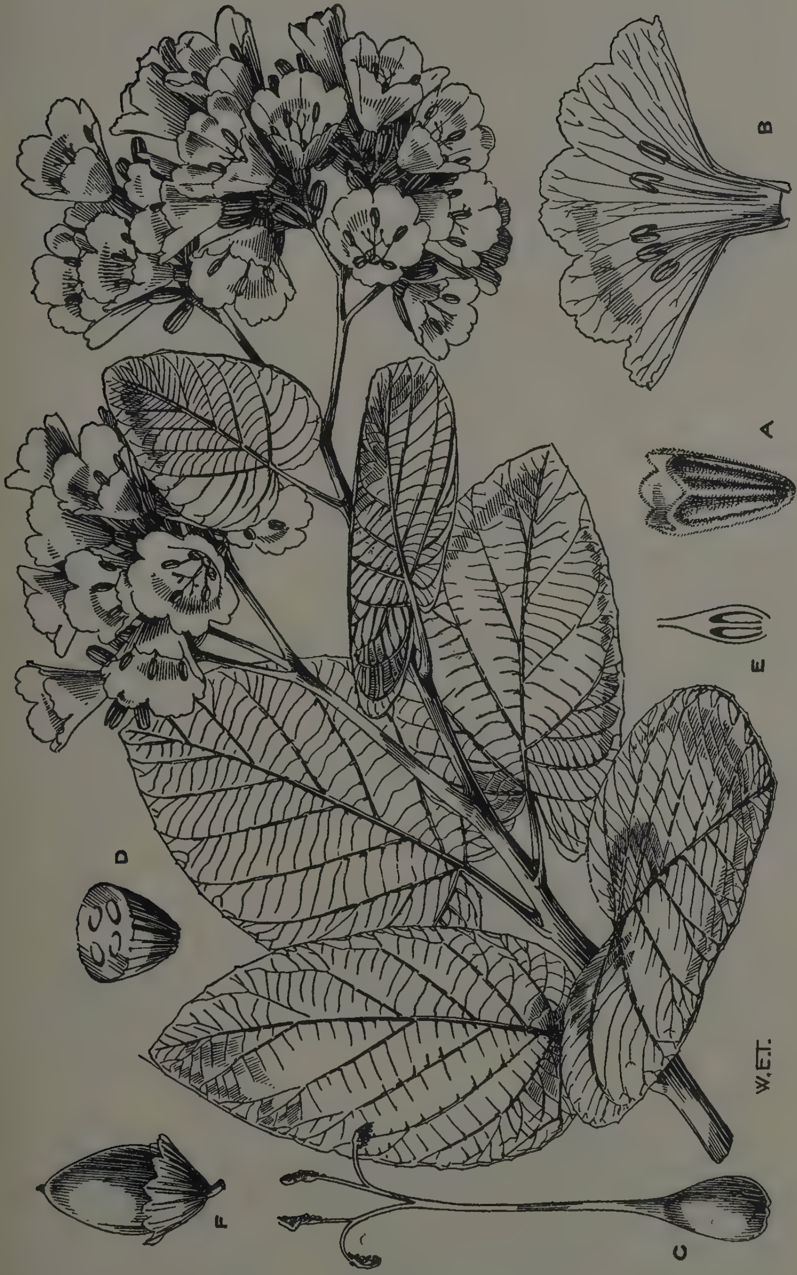

Fig. 244.—Cordia abyssinica *R. Br.* (Boraginaceae).

A, calyx. B, open corolla. C, pistil. D, cross-section of fruit. E, longitudinal section of ovary. F, fruit.

French Guinea: Mamou (Nov.)! N. Nigeria: commonly found in the neighbourhood of villages! Extends to E. Sudan, Abyssinia and south to Nyasaland. Exsicc.—*Dalz.* 88. *Shaw* 75. *Lamb* 79. *Foster* 84. *Moiser* 61. *Lely* P. 140. *Chev.* 14666. (See Appendix).

6. **C. Myxa** *Linn.*—F.T.A. 4, 2 : 14; Hutch. in Kew Bull. 1918 : 217, with fig.; Holl. 3 : 470; Chev. Bot. 448. *Vitex gomphophylla* Baker. A shrub or tree up to 40 ft. high with stout stem, nearly glabrous branchlets, and cream-white flowers ⅓ in. long in lax paniculate cymes.

French Sudan: Moussaia (Feb.)! Sonilia (Feb.)! French Guinea: between Timbo and the Upper Niger (May)! Ivory Coast: Baoulé-Nord, Languassou, in savannah (July)! Gold Coast: N.W. Ashanti, between Wenchi and Amoma (Mar.)! N. Terr., Kunche village, Cherepong to Yaga (fr. Mar.)! Probably introduced and cultivated but apparently naturalised; native of Asia Minor and Palestine. (See Appendix).

7. **C. Johnsonii** *Baker*—F.T.A. 4, 2 : 13. *C. Warneckei* Gürke—Chev. Bot. 449. A low shrub with densely pubescent branchlets, leaves 3-nerved from shortly above the base, and cream-yellowish flowers ⅓–½ in. long in short dense cymes; fruit pointed, ½ in. long.

Gold Coast: Afram Plains (Mar.)! Togo: Lome! Dahomey: Djougou! Exsicc.—*Johnson* 705. *Warnecke* 100; 308. *Chev.* 23911.

8. **C. Millenii** *Baker*—F.T.A. 4, 2 : 11; Holl. 3 : 470; Chev. Bot. 448. *C. Irvingii* Baker, partly. A large forest tree often planted in native towns, pale brownish-tomentose on the young parts, with large leaves, and yellowish flowers ¾ in. long crowded in cymes.

Gold Coast to S. Nigeria: common! Exsicc.—*Rowland.* *Barter* 3400. *Millen* 12; 210. *Dawodu* 179. *Punch* 102. *Dalz.* 1146. *Johnson* 625; 744. *Thompson* 77. *Moor* 854. *Vigne* 861; 939. (See Appendix).

9. **C. platythrsa** *Baker*—F.T.A. 4, 2 : 12; Holl. 3 : 471. *C. Irvingii* Baker, partly. *C. candidissima* A. Chev. Bot. 447, name only. *C. platyphylla* A. Chev. l.c. 448, name only. A tree 30–80 ft. high, pale brownish-pubescent on the young parts, with white funnel-shaped flowers in cymes forming a spreading panicle.

Sierra Leone: Bagroo R. (Apr.)! Freetown! Moyamba (Mar.)! Ivory Coast (often planted in villages). S. Nigeria: Abeokuta! Ikorodu (Mar.)! Extends to Gabon. Exsicc.—*Mann* 875. *Irving.* *Lane-Poole* 101; 535. *Schlechter* 12999. *Chev.* 16336; 16966; 17666 bis; 17789; 19098. (See Appendix).

10. **C. chrysocarpa** *Baker*—F.T.A. 4, 2 : 11. *C. yombomba* Vaupel. A tree with large broad leaves.

Cameroons Mt.: Buea (Mar.)! Also in Angola. Exsicc.—*Reder* 23a; 355; 427; 1377.

*Imperfectly known species.*

**C. guineensis** *Thonn.*—F.T.A. 4, 2 : 17.

Gold Coast: by the sea-shore at Accra. Exsicc.—*Thonning.*

## 4. COLDENIA Linn.—F.T.A. 4, 2 : 28.

Annual procumbent herb, densely setose all over; leaves shortly petiolate, oblong, up to 2·5 cm. long and 1 cm. broad, rounded at each end, dentately lobulate, the hairs converging between and revealing the nerves above; flowers solitary, axillary, shortly pedicellate; fruit glandular-pubescent, laterally 4-lobed, apiculate, about 4 mm. diam. .. .. .. .. .. .. .. .. .. .. *procumbens*

**C. procumbens** *Linn.*—F.T.A. 4, 2 : 28; Chev. Bot. 449. Whitish hairy, spreading from a woody base, with wrinkled leaves and small scarlet or white flowers: in wet places, by muddy pools (in habit resembling *Chrozophora*).

French Sudan: near Djenné! Day! Senegal: Richard Tol (Jan.)! Gambia! French Guinea: Kankan! N. Nigera: Lokoja! Yola (Apr.)! Bauchi, 2,200 ft. (May)! Extends to Red Sea, E. Africa and south to Angola. Exsicc.—*Roger* 144. *Barter* 1672. *Dalz.* 155. *Lely* 173. (See Appendix).

## 5. HELIOTROPIUM Linn.—F.T.A. 4, 2 : 30.

Leaves broadly ovate, more or less cuneate into the winged petiole, more or less triangular-pointed at the apex, up to 12 cm. long and 8 cm. broad, more or less undulate-dentate, shortly pubescent; sometimes bullate; stems densely pilose or villous; spikes slender, curled towards the tip, up to 20 cm. long; corolla about 8 mm. long; fruit ovoid, ribbed, glabrous .. .. .. .. .. .. .. 1. *indicum*

Leaves linear to obovate (never ovate):

Corolla-lobes with long linear-filiform points; leaves lanceolate, acute, 4–6 cm. long, up to 1·4 cm. broad, setulose-pilose; stems long-setose-pilose and with short gland-tipped hairs; fruits ovoid, slightly rugose .. .. .. 2. *zeylanicum*

Corolla-lobes without filiform points:

Leaves rather broadly obovate-oblanceolate to obovate:

Flowers very small and numerous in a close slender spike-like cyme, appressed-pilose; calyx 2–3 mm. long; leaves oblong-elliptic, densely to thinly villous on both sides; fruits depressed, pubescent .. .. .. .. 3. *ovalifolium*

Flowers few, rather laxly spicate, softly villous; calyx about 5 mm. long; leaves elliptic, appressed-pilose between the nerves above, villous below; fruit ovoid, 4-ribbed, rugulose .. .. .. .. .. .. .. .. 4. *supinum*

Leaves more or less lanceolate to linear:

Leaves linear or linear-oblanceolate, several times longer than broad:

Leaves linear, not undulate, 2–2·5 cm. long, appressed-setose-pilose on both sides; flowers distinctly pedicellate; fruit depressed, sparingly setulose 5. *strigosum*

Leaves oblanceolate, with strongly undulate margins, up to 8 cm. long and 1·5 cm. broad, setulose-scabrid on both surfaces; flowers in dense short scorpioid cymes; stems setose-pilose; fruit glabrous .. .. .. .. 6. *undulatum*

Leaves shortly lanceolate, about 3 times as long as broad; inflorescence leafy, the flowers appearing solitary; fruit ovoid, beaked .. .. .. 7. *Baclei*

1. **Heliotropium indicum** *Linn.*—F.T.A. 4, 2 : 32; Stapf 634; Holl. 3 : 472; Chev. Bot. 450. Robust annual 1–3 ft. high with small lilac, sometimes white, flowers in long dense curled spikes.

A common weed of waste places near dwellings, throughout the area! Also in the Eastern tropics. (See Appendix).

2. **H. zeylanicum** *Lam.*—F.T.A. 4, 2 : 31 ; Chev. Bot. 451. A coarse erect branched perennial with tap-root, more or less glandular-hairy, with small whitish tubular flowers in lax scorpioid spikes up to 9 in. long.
French Sudan : Fereibo, at mouth of the Débo (Aug.) ! Senegal : Richard Tol (Jan.) ! N. Nigeria : Katagum (June) ! Kuka, by Lake Chad (Feb.) ! Throughout tropical Africa, and in the Mediterranean region to India. Exsicc.—*Roger* 109. *E. Vogel* 36. *Dalz.* 76. (See Appendix).

3. **H. ovalifolium** *Forsk.*—F.T.A. 4, 2 : 34. *H. niveum* A. Chev. Bot. 450. Diffuse densely-white-villous stems from a woody base and tap-root, with small white flowers in cymes 2–3 in. long.
French Sudan : Sebi (July) ! Sompi (Oct.) ! Senegal : Richard Tol, etc. (June) ! N. Nigeria : Nupe ! Sokoto, fields and waste places (July) ! Bauchi Plateau, Mamu, 2,500 ft. (May) ! In tropical Africa generally extending to Transvaal. Exsicc.—*Sieber* 12. *Döllinger* 56. *Barter* (no number). *Dalz.* 388. *Lely* 164 ; 165. *Chev.* 1167 ; 2882 ; 2885. (See Appendix).

4. **H. supinum** *Linn.*—F.T.A. 4, 2 : 37. Hairy much-branched herb, decumbent from a woody base.
N. Nigeria : Kuka, Lake Chad ! In N. and S. Africa, Canary Islands, S. Europe and Eastern tropics. Exsicc.—*E. Vogel.*

5. **H. strigosum** *Willd.*—F.T.A. 4, 2 : 41 ; Chev. Bot. 451. Perennial, branched, erect or spreading from a woody base, up to 1 ft., with appressed white bristly hairs, and small white flowers.
French Sudan and Senegal, common in sandy soil ! Ivory Coast : Mankono, between Bouandougou and Marabadiassa ! Gold Coast ; Cape Coast ! Accra, common ! Ashanti, Bjury ! Yeji ! N. Terr., Salaga ! Togo : Lome ! Dahomey ! N. Nigeria : Nupe ! Lokoja (Mar.) ! Bauchi Plateau, common, in farms, etc. Throughout tropical Africa, Egypt and Arabia ; also Australia. Exsicc.—*Roger* 106 ; 108. *Don. T. Vogel* 6 ; 14. *Barter* 307. *Burton Brown* 355. *Shaw* 37. *Krause. Warnecke* 19.

6. **H. undulatum** *Vahl*—F.T.A. 4, 2 : 37 ; Holl. 3 : 472 ; Chev. Bot. 451. *H. erosum* Baker & Wright—F.T.A. 4, 2 : 38, not of Lehm. Suberect or prostrate from a perennial stock, covered with white bulbous-based bristles, with small white flowers.
French Sudan : Central Sahara ; Silet, 2,500 ft. (Mar.) ! Senegal : Dakar, St. Louis, etc., common in waste and sandy places ! N. Nigeria : Sokoto (Nov.) ! Katagum (Sept.) ! Kuka (Jan.) ! Maigumeri (Nov.) ! Cape Verde Islands and Mauritania to E. Sudan and Angola. Exsicc.—*Döllinger. Sieber* 11. *E. Vogel* 12. *Elliott* 122. *Dalz.* 74. *Moiser* 229 ; 237. *Chipp* 111.

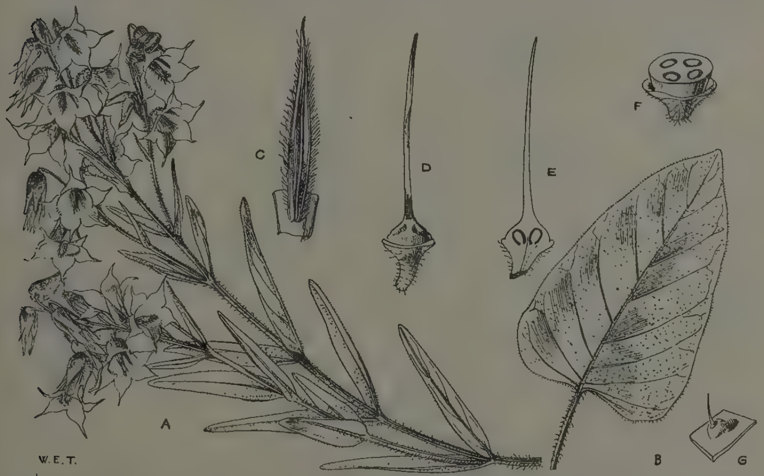

FIG. 245.—TRICHODESMA AFRICANUM *R. Br.* (BORAGINACEAE).

A, upper part of plant. B, lower leaf. C, anther. D, pistil. E, longitudinal, and F, cross-section of same. G, portion of leaf showing bulbous-based hair.

7. **H. Baclei** *DC.*—F.T.A. 4, 2 : 34. *H. marifolium* Baker & Wright—F.T.A. 4, 2 : 40 not of Retz ; Chev. Bot. 450. *H. nigerinum* A. Chev. Bot. 450. Much-branched, decumbent, slightly woody below, with small white flowers with yellow centre.
French Sudan : San, in sand on banks of the Bani R. (June) ! Sébi (July) ! Djenné (July) ! Day (Aug.) ! Senegal ! Gambia ! French Guinea : between Mamou and Kindia (May) ! Sierra Leone : Limba, Makunde ! N. Prov., Urika, in a dried swamp (Mar.) ! Exsicc.—*Heudelot* 874. *Hayes* 543. *Sc. Elliot* 5717. *N. W. Thomas* 8836. *Glanville* 152 ; 190. *Chev.* 1063 ; 1168 ; 1365, etc.

*Imperfectly known species.*

**H. africanum** *Schum. & Thonn.*—F.T.A. 4, 2 : 43.
" Guinea " : Accra district ? Exsicc.—*Thonning.* Probably the same as *H. indicum* Linn.

### 6. TRICHODESMA R.Br.—F.T.A. 4, 2 : 44.

Leaves (except the upper ones) fairly long-petiolate, ovate to broadly lanceolate, truncate to acute at the base, up to 12 cm. long and 7 cm. broad, scabrid on both surfaces with short bristles from a discoid base ; cymes lax and few-flowered ; calyx-segments narrowly lanceolate, gradually acute, about 1 cm. long, with a conspicuously bristly midrib and margins ; anthers densely villous, with spirally connivent tips 1. *africanum*

Leaves all sessile, lanceolate or ovate-lanceolate, narrowed at the base, about 5 cm. long and up to 2·5 cm. broad, tuberculate-scabrid ; cymes lax and few-flowered ; calyx-segments ovate-lanceolate, acutely acuminate, 1·5 cm. long, broadening in fruit; anthers loosely villous.. .. .. .. .. .. .. 2. *physaloides*

1. **T. africanum** *R.Br.*—F.T.A. 4, 2 : 48; Holl. 3 : 472; Chev. Bot. 451. Erect branched annual 2–3 ft. high, harshly scabrid, with flowers ½ in. long white, the throat yellow with chocolate spots.
French Sudan: Central Sahara; 10 miles north of Abelessa, 3,050 ft. (Mar.)! Silet, 2,500 ft. (Mar.)! N. Nigeria: Borgu! Kontagora (Jan.)! Bauchi Plateau, Bauchi, 2,200 ft. (May)! Gujba (Dec.)! Kuka (Feb.)! Also in Cape Verde Islands and Mauritania, extending to Western India and to S. Africa. Exsicc.—*E. Vogel* 43. *Barter* 770. *Dalz.* 115. *Foster* 83. *Lely* 169. *Chipp* 50; 100. (See Appendix).
2. **T. physaloides** *A.DC.*—F.T.A. 4, 2 : 46. Stems herbaceous 1–2 ft. high from a woody rootstock, roughly hairy at first, with conspicuous bluish or white flowers 1–1½ in. across, spotted in the throat.
N. Nigeria: Kaduna! Maigana! Bauchi Plateau, Vom, etc., 3,000–4,500 ft.! Extends to E. Sudan and to S. Africa. Exsicc.—*Lamb* 95. *Hill* 47. *Dent Young* 176. *Vigo*. *Lely* P. 74.

*T. uniflorum* Brand in Fedde Repert. 12 : 504, from British Cameroons is **T. indicum** *R.Br.*, an introduced species from the Eastern tropics.

## 7. **CYNOGLOSSUM** Linn.—F.T.A. 4, 2 : 51.

Spines on the nutlets marginal and on the midrib, not spread all over the surface:

Leaves ovate, acuminate, narrowed at the base into a short winged petiole, 6–12 cm. long, 4–7 cm. broad, pilose with discoid-based hairs on the upper surface, softly and shortly pubescent below; cymes few-flowered; calyx-lobes broadly ovate, setulose; corolla nearly twice as long as the calyx; nutlets 7 mm. diam., smooth between the bristles.. .. .. .. .. .. .. .. .. 1. *lancifolium*

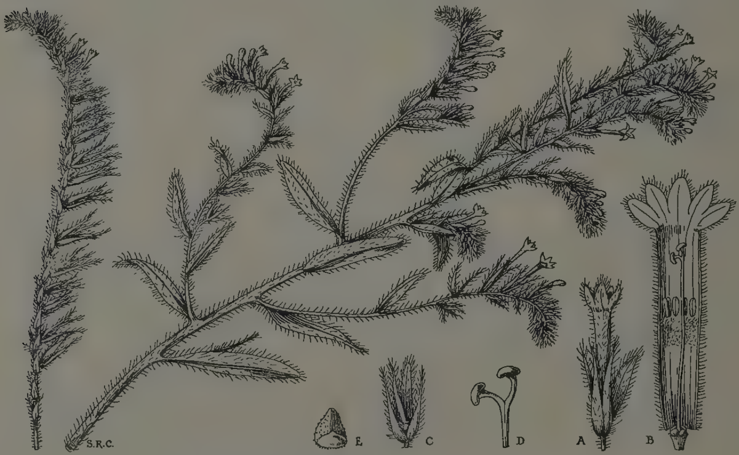

FIG. 246.—ARNEBIA ASPERRIMA *Hutch. & J. M. Dalz.* (BORAGINACEAE).

A, flower. B, flower with corolla laid open. C, calyx and young fruit. D, style-arms. E, nutlet.

Leaves lanceolate, acutely acuminate, up to 14 cm. long and 3 cm. broad, rather closely pilose with bulbous-based hairs on the upper surface, setose-pilose below; cymes slender; calyx-lobes oblong; corolla slightly larger than the calyx; nutlets smooth except for the midrib and bristly margins.. .. .. .. .. 2. *Mannii*

Spines on the nutlets spread all over the surface; nutlets ellipsoid, about 4 mm. long; leaves broadly lanceolate, 4–6 cm. long, 1·5–2 cm. broad, setulose-scabrid above, sparingly so below; cymes long and slender when in fruit .. 3. *lanceolatum*

1. **Cynoglossum lancifolium** *Hook. f.*—F.T.A. 4, 2 : 53. Erect herb up to 3 or 4 ft. high, hispid, with blue flowers ¼ in. across.
Cameroons Mt., grasslands, 7,000–8,000 ft. (Dec.)! Exsicc.—*Mann* 1266; 2004. *Johnston* 10; 57. *Maitland* 966.
2. **C. Mannii** *Baker & C. H. Wright*—F.T.A. 4, 2 : 52. Erect herb, scabrid-pilose, up to 4–6 ft. high, with white flowers.
S. Nigeria: Lagos! Idumuye (Jan.)! Cameroons Mt.: Buea and neighbourhood, common (Feb., June)! Upper grasslands, 7,000–8,000 ft. (Dec.)! Exsicc.—*Mann* 2005. *Dalz.* 8214. *Maitland* 47; 949; 973; 1015. *Millen* 130. *N. W. Thomas* 2180.
3. **C. lanceolatum** *Forsk.*—F.T.A. 4, 2 : 54; Chev. Bot. 452. A pilose herb 3–6 ft. high, with white or bluish flowers.
Liberia: Cape Palmas (July)! Ivory Coast: Guidéko (June)! Gold Coast: Larte (Oct.)! S. Nigeria: ? locality! Cameroons Mt., Buea! A plant of the Old World tropics and subtropics. Exsicc.—*T. Vogel* 18. *Johnson* 820. *N. W. Thomas* 1745; 1827. *Deistel* 653.

## 8. **ARNEBIA** Forsk.—F.T.A. 4, 2 : 55.

Whole plant densely hispid with long stiff white hairs; leaves linear-lanceolate, subacute, up to 8 cm. long and 1 cm. broad; cymes scorpioid; calyx-segments linear-subulate, about 8 mm. long, densely setose; corolla-tube narrow, 1 cm. long, lobes slightly pubescent; nutlets angular, rugose .. .. .. .. *asperrima*

**A. asperrima** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. *Anchusa asperrima* Del. *Arnebia hispidissima* DC.—F.T.A. 4, 2: 56; Holl. 3: 473. Much-branched from a hard woody base, sometimes short and bushy, the hairs almost pungent, with yellow tubular flowers ½ in. long and a blood-red root; a plant of dry sandy soil.

N. Nigeria: Katagum (Nov.)! Bornu, Lake Chad area (Apr.)! Extends through N. Trop. Africa to N. India. Exsicc.—*E. Vogel* 91. *Dalz.* 75. (See Appendix).

### 9. **LEUROCLINE** S. Moore in Journ. Bot. 1901: 257.

A low shrublet; leaves sessile, oblanceolate, obtuse, thick, up to 1 cm. long, greenish, glaucous, covered with rigid hairs, the upper ones gradually smaller; flowers axillary-solitary; calyx 5-partite, pilose; corolla tubular, limb oblique, the tube 7 mm. long; lobes 5, ovate; anthers at the mouth of the corolla, on very short filaments; style slightly bilobed; nutlets ovoid-lanceolate, pointed, rugose.. *mauritanica*

**L. mauritanica** *Bonnet* in Bull. Mus. Bordeaux 1908: 403; and in Act. Soc. Linn. Bordeaux 63: 29, t. 2. *L. Chazaliei* A. Chev. Bot. 452, name only.

Mauritania: very abundant in sandy places around Port Etienne (Mar.)! Exsicc.—*Gruvel* and *Chudeau*. *Caille* in *Herb. Chev.* 25422, etc.

### 10. **LITHOSPERMUM** Linn.—F.T.A. 4, 2: 58.

Stems appressed-pubescent and setose; leaves lanceolate or ovate-lanceolate, sessile, 1–1·5 cm. long, rigid, appressed-setulose above, the hairs with bulbous bases, softly appressed-pilose below; corolla-tube slender, pubescent towards the top, about 8 mm. long, lobes ovate, 2·5 mm. long; nutlets ovoid, subacute, smooth .. *callosum*

**L. callosum** *Vahl*—Chev. Bot. 452.

Mauritania: various localities, Adrar, etc.! Extends through N. Africa to Egypt, Palestine and Arabia. Exsicc.—*Charles* in *Herb. Chev.* 25466, etc.

### 11. **MYOSOTIS** Linn.—F.T.A. 4, 2: 57.

Racemes with a leafy bract subtending each flower, short; stems dwarf; leaves narrowly oblong-lanceolate, the larger about 2 cm. long and 6 mm. broad, pilose-setose on both surfaces; calyx-lobes narrowly linear-lanceolate, 3–4 mm. long 1. *abyssinica*

Racemes without leafy bracts, slender; stems up to 60 cm. high; leaves linear-lanceolate, acute, the larger about 5 cm. long and 1 cm. broad, thinly pilose on both surfaces; pedicels up to 5 mm. long in fruit, shortly pubescent; calyx-lobes lanceolate, pubescent .. .. .. .. .. .. .. .. .. 2. *sylvatica*

1. **M. abyssinica** *Boiss.*—F.T.A. 4, 2: 58. Herb a few inches high, harshly pubescent, with small white flowers. Cameroons Mt., 8,000–10,000 ft. (Nov.)! Fernando Po, 8,500 ft.! Also in E. Africa from Abyssinia to Tanganyika. Exsicc.—*Mann* 1459; 2033.
2. **M. sylvatica** *Hoffm.*—F.T.A. 4, 2: 57. Erect 1–2 ft. high, thinly hairy, with bright blue flowers. Cameroons Mt., 7,000 ft., upper forest! Also in E. Africa from Abyssinia to Tanganyika. Exsicc.—*Johnston* 72.

## 135. SOLANACEAE

With A. A. Bullock

Herbaceous or woody. Leaves alternate, simple; stipules absent. Flowers hermaphrodite, mostly actinomorphic. Calyx 4–6-lobed, persistent. Corolla gamopetalous, usually 5-lobed, lobes folded, contorted or valvate. Stamens inserted on the corolla-tube and alternate with its lobes; anthers 2-celled, cells parallel, opening lengthwise or by apical pores. Ovary 2-celled, the cells sometimes again divided by a false septum; style terminal. Ovules very numerous, axile. Fruit a capsule or berry. Seeds with copious endosperm and curved or annular embryo.

Generally distributed, but most numerous in tropical regions.

Fruit a capsule:
  Capsule circumscissile; flowers in secund scorpioid cymes .. 1. **Hyoscyamus**
  Capsule 4-valved; stamens 5; leaves and flowers large .. .. .. 2. **Datura**
  Capsule 2-valved:
    Stamens 5; flowers medium-sized .. .. .. .. .. .. 3. **Nicotiana**
    Stamens 2; flowers very small .. .. .. .. .. 4. **Schwenkia**
Fruit a berry:
  Anthers opening by slits lengthwise:
    Calyx not enlarged in fruit or not strikingly so:
      Corolla rotate, valvate .. .. .. .. .. .. .. 5. **Capsicum**
      Corolla urceolate, induplicate-valvate .. .. .. .. 6. **Discopodium**
      Corolla tubular, lobes imbricate .. .. .. .. .. .. 7. **Lycium**

Calyx enlarged and inflated in fruit :
  Flowers solitary .. .. .. .. .. .. .. .. 8. **Physalis**
  Flowers fasciculate .. .. .. .. .. .. .. .. 9. **Withania**
Anthers opening by terminal pores .. .. .. .. .. 10. **Solanum**

## 1. HYOSCYAMUS Linn.—F.T.A. 4, 2 : 258.

Stems shortly glandular-pubescent ; leaves with broad flat petioles, elliptic-lanceolate, acute, shortly attenuated at the base, 8–10 cm. long, 3–4·5 cm. broad, entire or slightly toothed, nearly glabrous ; flowers in long scorpioid simple cymes, subsessile ; calyx narrowly campanulate, about 2 cm. long in flower, lengthening to 3 cm. in fruit, broadly dentate, nervose, puberulous outside ; corolla a little longer than the calyx ; anthers exserted .. .. .. .. .. .. .. .. *Falezlez*

**H. Falezlez** *Coss.* in Bull. Soc. Bot. Fr. 11 : 166, t. 5 ; Chev. Bot. 468. Herbaceous perennial, more or less viscid-pubescent, 2–3 ft. high with a woody tap-root and greenish-white or bluish-purple flowers about 1 in. long.

Mauritania : N. W. Adrar ! French Sudan : Timbuktu region. Silet and Tibeghim, 2,500 ft. (Mar.) ! Also in N. Africa and Sahara. Exsicc.—*Schmitt* in *Herb. Chev.* 28538. *Chipp* 95 ; 97. (See Appendix).

## 2. DATURA Linn.—F.T.A. 4 : 2 : 256.

Petioles and branchlets densely and softly grey-pubescent or pilose ; leaves ovate, unequal, rounded or truncate at the base, 8–20 cm. long, 4–14 cm. broad, entire, thinly pubescent below ; flowers solitary, usually axillary ; pedicels 1·5 cm. long, densely pilose ; calyx tubular, about 9 cm. long ; corolla narrowly trumpet-shaped, up to 18 cm. long, 10-lobed, lobes broadly triangular ; capsule pendulous on the elongated pedicel, prickly, globose, 3–4 cm. diam., dehiscence irregular .. .. 1. *Metel*
Petioles and branchlets glabrous ; corolla 5–6 lobed, lobes long-cuspidate or long-acuminate :
  Capsule pendulous, dehiscing irregularly ; leaves elliptic to broadly ovate or triangular-ovate, up to 20 cm. long, 14 cm. broad, subentire or with a few dentate lobes ; pedicels 1 cm. long ; calyx tubular, 6 cm. long, 1·5 cm. diam. ; corolla often double, up to 20 cm. long, the 5–6 lobes long-cuspidate ; capsule densely prickly .. 2. *fastuosa*
  Capsule erect, dehiscing by 4 valves ; leaves rather narrowly ovate, up to 24 cm. long, 10 cm. broad, more or less coarsely dentate ; pedicels very short ; calyx tubular, up to 3·5 cm. long, 4 mm. diam. ; corolla about 8 cm. long, the 5–6 lobes long-acuminate ; capsule not very densely prickly .. .. .. 3. *Stramonium*

1. **D. Metel** *Linn.*—F.T.A. 4, 2 : 256 ; Holl. 3 : 493 ; Chev. Bot. 468. Erect branched herbaceous undershrub 2–4 ft. high, with long white flowers and spiny spherical fruits ; in waste places.
   Senegal : Dakar, etc. (Jan.) ! French Guinea : Farana, by the Niger (fl. and fr. Mar.) ! N. Nigeria: Lokoja (Mar.) ! Katagum ! Cosmopolitan in the tropics. Exsicc.—*Boivin*. *Sc. Elliot* 5387. *Dalz.* 93. *Shaw* 41. *Chev.* 2874. (See Appendix).
2. **D. fastuosa** *Linn.*—F.T.A. 4, 2 : 256. *D. alba* Nees in Trans. Linn. Soc. 17 : 73. *D. fastuosa* var. *alba* C. B. Clarke—F.T.A. 4, 2 : 257 ; Holl. 3 : 492 ; Chev. Bot. 468. Habit of the last, 2–3 ft. high, with white or wine-purple flowers.
   Sierra Leone : Regent ! Kanike (Sept.) ! Roruks (Nov.) ! Victoria (Mar.) ! Gorongo, near Pujehun (Dec.) ! Serabu, Bumpe Chiefdom (Apr.) ! Ivory Coast : Middle Cavally, between Fort Binger and Mt. Niénokoué (July) ! Cavally Basin, Tépo country, between Grabo and Taté (Aug.) ! Extends to Angola, Uganda and E. Africa to Nyasaland. Exsicc.—*Sc. Elliot* 4107. *N. W. Thomas* 2058 ; 5754 ; 9333. *Deighton* 267 ; 1724. (See Appendix).
3. **D. Stramonium** *Linn.*—F.T.A. 4, 2 : 257 ; Holl. 3 : 493 ; Chev. Bot. 468. Erect branched annual, with smooth stems 1–2 ft. or more high, and rather slender white flowers.
   French Sudan : Kabarah ! Gold Coast : Assin Yan Kumasi ! Accra, Achimota, etc., in waste places near villages (June) ! Togo : Lome ! Dahomey : Porto Novo, Lower Ouémé, Hétinn ! Agouagon ! N. Nigeria : Bornu, Kuka, by Lake Chad (Feb.) ! Extends to E. Sudan, Somaliland and Angola ; also throughout the tropics and temperate regions. Exsicc.—*E. Vogel* 56. *Cummins* 8. *Dalz.* 118. *Warnecke* 364. (See Appendix).

## 3. NICOTIANA Linn.—F.T.A. 4, 2 : 259.

Corolla about 4 cm. long, 3–4 mm. diam. in lower half of the tube, lobes very acute ; upper leaves oblong-lanceolate to elliptic, apex acute, decurrent at the base, 8–15 cm. long, 1·5–6 cm. broad, sessile or subsessile ; inflorescence a terminal cyme ; pedicels glandular-pubescent, 1·5 cm. long ; calyx about 1·5 cm. long, lobes long-acuminate ; capsule ovoid or ellipsoid, 2 cm. long, surrounded by the persistent calyx, and with a short apical beak .. .. .. .. .. .. .. .. 1. *Tabacum*
Corolla not more than 2 cm. long, 6–7 mm. diam., lobes rounded or subacute ; upper leaves broadly ovate or oblong-elliptic rounded or subacute at the apex and base, 4–10·5 cm. long, 2–7 cm. broad, petioles up to 4 cm. long ; inflorescence and pedicels as above ; calyx about 1 cm. long, lobes broadly triangular, acute ; capsule globose, about 1·2 cm. diam., without an apical beak .. .. .. .. 2. *rustica*

1. **N. Tabacum** *Linn.*—F.T.A. 4, 2 : 259 ; Holl. 3 : 496 ; Chev. Bot. 468. Robust annual up to 6 ft. high, with long tubular white or pinkish, sometimes pale yellow flowers viscid-glandular outside.
   Cultivated throughout the area ! Tropical to South Africa, and S. America. (See Appendix).
2. **N. rustica** *Linn.*—F.T.A. 4, 2 : 260 ; Holl. 3 : 496 ; Chev. Bot. 468. Herb, branched, up to 4 ft. high, with short greenish-yellow flowers villous outside ; cultivated.
   Mauritania and French Sudan, Kangaba, Simona, etc. ! French Guinea : Farana, Socourala ! Sierra Leone : Yetaya, and other localities ! Liberia ! Also in E. Sudan and E. Africa, and in Argentina. Exsicc.—*Johnston*. *Smythe* 128. *N. W. Thomas* 2288 ; 2426. (See Appendix).

## 4. **SCHWENKIA** Linn.—F.T.A. 4, 2 : 260.

Herb, glabrous or sparingly pubescent, branching freely ; lower leaves petiolate, elliptic to ovate, up to 4 cm. long and 2·5 cm. broad, rounded to subacute, entire ; upper leaves becoming narrowly oblong, sessile ; inflorescence a lax panicle, pedicels 0·5 cm. long ; calyx-teeth triangular, tube cylindric, 3 mm. long ; corolla narrowly tubular, 7–9 mm. long, lobes broadly and obtusely triangular, two rather larger than the rest, alternating with club-shaped processes ; fruit a subglobose capsule 4 mm. diam., surrounded by the persistent calyx and dehiscing by two valves .. *americana*

**S. americana** *Linn.*—F.T.A. 4, 2 : 260 ; Holl. 3 : 505 ; Chev. Bot. 469. *S. hirta* C. H. Wright in F.T.A. 4, 2 : 261, not of Klotzsch ; Holl. 3 : 506 ; Chev. Bot. l.c. Erect slender-branched herb 1–3 ft. high, slightly woody below, with small inconspicuous flowers dull brown-purple or greenish-lilac.

Common from Senegal and French Sudan to N. and S. Nigeria ! Extending to E. Sudan and Nile Land, and to Angola. Also in tropical America. Exsicc.—*Leprieur.* *T. Vogel* 12 ; 89 ; 153 ; 159. *Barter* (no number). *Sc. Elliot* 3887 ; 4322 ; 5087a ; 5830. *Brown* 308. *Millen* 100. *Dawodu* 4. *Hill* 41. *Dalz.* 118 ; 431 ; 546 ; 722. *Chev.* 390. *Debeaux* 421. *Krause.* *Schlechter* 12332. (See Appendix).

## 5. **CAPSICUM** Linn.—F.T.A. 4 ; 2 : 250.

Annual or biennial herbs ; leaves broadly lanceolate to ovate, apex acutely acuminate, cuneate or abruptly acute at the base, 5–8 cm. long, 2–5 cm. broad, entire, subglabrous ; flowers in 3–8-flowered axillary clusters, producing usually only one fruit ; pedicels up to 1·5 cm. long, swollen in the upper part ; calyx obscurely 5–toothed, 10-ribbed ; corolla rotate-campanulate, deeply 5-lobed, 5 mm. diam. ; fruit a more or less elongated berry, subglobose to acutely conical, from one to several cm. long

1. *annuum*

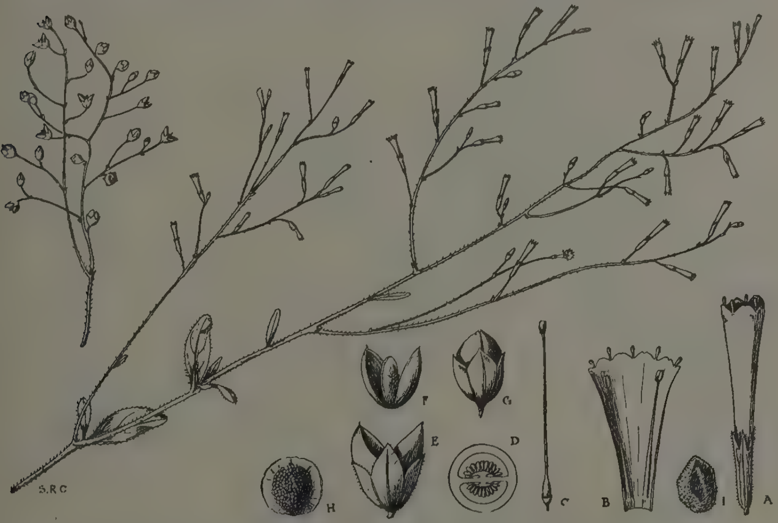

Fig. 247.—Schwenkia americana *Linn.* (Solanaceae).

A, flower. B, corolla laid open. C, pistil. D, cross-section of ovary. E, F, G, fruit. H, I, seed.

Suffruticose perennial ; very similar to the above, but readily distinguished by its habit ; calyx truncate ; fruits usually 2 or more from each flower-cluster

2. *frutescens*

1. **C. annuum** *Linn.*—F.T.A. 4, 2 : 251 ; Holl. 3 : 489 ; Chev. Bot. 466. Herbaceous up to 2–5 ft. high, much branched, angular, glabrous, with white or greenish-white flowers $\frac{1}{4}$–$\frac{1}{3}$ in. in diameter.
   Cultivated throughout the area ! Widely dispersed in the tropics. (See Appendix).
2. **C. frutescens** *Linn.*—F.T.A. 4, 2 : 251 ; Stapf 636 ; Holl. 3 : 490 ; Chev. Bot. 467. Undershrub 2–3 ft. high, with slightly angled nearly glabrous branchlets and white or pale yellow flowers.
   Cultivated throughout the tropics ! (See Appendix).

## 6. **DISCOPODIUM** Hochst.—F.T.A. 4, 2 : 253.

Small tree or shrub, 15–20 ft. high ; leaves elliptic to oblong-elliptic, broadly acuminate, cuneate at the base, 10–25 cm. long, 3–10 cm. broad, entire, glabrous or slightly pubescent on the midrib and 10–12 pairs of lateral nerves below : petioles 1–2 cm. long ; flowers fasciculate, axillary ; pedicels 1–1·5 cm. long ; calyx 4 mm. long, lobes

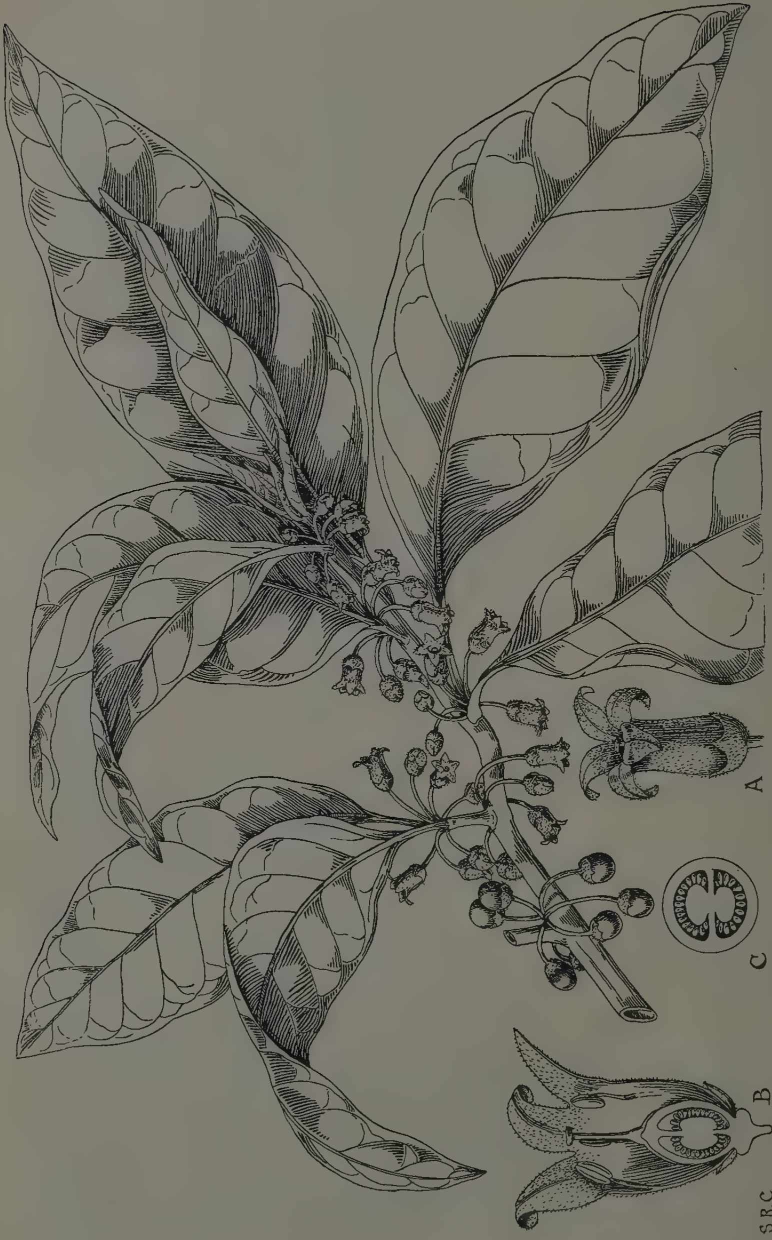

FIG. 248.—DISCOPODIUM PENNINERVIUM *Hochst.* (SOLANACEAE).
A, flower. B, longitudinal section of flower. C, cross-section of ovary.

broadly triangular, spreading; corolla cylindric, about 8 mm. long, tomentellous outside above the calyx, lobes more or less reflexed or spreading, half as long as the tube; stamens and style included; berry globose, 6–8 mm. diam. .. *penninervium*

**D. penninervium** *Hochst.*—F.T.A. 4, 2 : 253. Flowers white or yellowish fading to brown.
Cameroons Mt., 7,000 ft. (Dec., Feb.)! Fernando Po, 4,000 ft.! Also in East Africa from Abyssinia to Nyasaland. Exsicc.—*Mann* 300; 1236; 2178.

### 7. **LYCIUM** Linn.—F.T.A. 4, 2 : 253.

A shrub with rigid spinescent branches; leaves small on short pustular branchlets, linear-oblanceolate, about 1 cm. long, glabrous; flowers solitary; calyx campanulate, denticulate; corolla very slender, nearly 2 cm. long, glabrous .. .. *intricatum*

**L. intricatum** *Boiss.*—Elench. 143; Chev. Bot. 467.
Mauritania: Port Etienne and vicinity (Feb.–Mar.)! Also in Spain and Algeria. Exsicc.—*Caille* in *Herb. Chev.* 25419. (See Appendix).

### 8. **PHYSALIS** Linn.—F.T.A. 4, 2 : 246.

Annual herb, branches angular; leaves broadly lanceolate to elliptic in outline, acute, up to 10 cm. long and 6 cm. broad, entire to coarsely and irregularly dentate, subsessile or petioles up to 4 cm. long; flowers solitary; pedicels 1–2 cm. long; calyx campanulate, 3–5 mm. long, somewhat puberulous, becoming enlarged and bladder-like in fruit, up to 2 cm. diam.; corolla yellow or more or less blue; fruit a berry up to 1 cm. diam. .. .. .. .. .. .. .. .. .. *angulata*

**P. angulata** *Linn.*—F.T.A. 4, 2 : 248; Holl. 3 : 487; Chev. Bot. 465. *P. minima* Linn.—F.T.A. 4, 2 : 247; Holl. l.c.; Chev. Bot. l.c. Much-branched annual, pubescent or nearly glabrous, with angular stems and small yellowish or cream-white flowers.
A common weed throughout the area! Extending to E. Sudan, Eritrea, Uganda, E. Africa, Nyasaland, and to Angola. Exsicc.—*Roger* 132. *T. Vogel* 14; 37; 51; 66. *E. Vogel* 54. *Baikie* 8. *Barter* 829; 1493. *Rowland. Sc. Elliot* 4086. *Dawodu* 289. *Whyte. G. P. Cooper* 5. *Pobéguin* 369. *Warnecke* 192; 255. (See Appendix).

### 9. **WITHANIA** Pauq.—F.T.A. 4, 2 : 248.

Shrubby herb, stems stellate-tomentose; leaves elliptic to broadly ovate-lanceolate, apex acute to rounded, abruptly acute to long-decurrent at the base, 5–10 cm. long 2–5 cm. broad, entire or sinuate; petiole 1–2 cm. long; flowers 2–6 in axillary fascicles; pedicels about 5–6 mm. long, elongating to 1 cm. or more in fruit; calyx campanulate, divided to about the middle into 5 acute triangular lobes, inflated in fruit, 1–2 cm. long, up to 1 cm. broad; corolla campanulate, twice as long as the calyx, about 7–8 mm. long, stamens slightly exserted, style included; fruit a red, globose berry, enclosed by the inflated calyx .. .. .. .. .. .. *somnifera*

**W. somnifera** *Dunal*—F.T.A. 4, 2 : 249; Holl. 3 : 489. A much-branched undershrub 3–7 ft. high, with small colourless flowers ½ in. across.
Liberia: Cape Palmas (July)! N. Nigeria: Sokoto! Katagum (Sept.)! Bauchi Plateau, on farms (Apr.)! Bornu, Kuka (Feb.)! Widespread in the drier subtropical parts, extending to Persia and India, also in S. Africa, the Canary Islands and Cape Verde Islands. Exsicc.—*T. Vogel* 35. *E. Vogel* 58. *Dalz.* 91. *Lely* P. 209. (See Appendix).

### 10. **SOLANUM** Linn.—F.T.A. 4, 2 : 207.

Inflorescence terminal:

Leaves not lobed; branches and leaves without prickles:

Inflorescence paniculate or broadly cymose (not spiciform):

Leaves glabrous below; cymules paniculate; pedicels stout, up to 1 cm. long; leaves broadly oblong-lanceolate, obtusely acuminate, about 9 cm. long and 3 cm. broad, laxly venose-reticulate, shining above, glabrous; panicle about 15 cm. long; flowers very numerous; corolla 7 mm. long .. .. 1. *clerodendroides*

Leaves tomentose below with stellate hairs:

Stems with axillary subdormant buds bearing small leaves up to 2 cm. diam.; leaves elliptic to ovate-lanceolate, up to 16 cm. long and 8 cm. broad, densely tomentose on both surfaces; panicle lax, globose; calyx about 6 mm. long; corolla 1 cm. long .. .. .. .. .. .. 2. *auriculatum*

Stems without subdormant axillary buds; leaves elliptic to ovate, up to 21 cm. long and 10 cm. broad, pubescent above, tomentose below; inflorescence and flowers as above .. .. .. .. .. .. .. 3. *verbascifolium*

Inflorescence spiciform; cymules subsessile on the axis; pedicels very short; leaves glabrous, oblong to obovate, gradually acuminate, 7–15 cm. long, 3–6 cm. broad; calyx cupular, with minute teeth; corolla 7–8 mm. long, lobes linear-oblong; berry about 5 mm. diam. .. .. .. .. 4. *Welwitschii* var. *strictum*

Leaves pinnately lobed; branches and often the leaves armed with sharp prickles; leaf-blade elliptic, deeply lobed, subacute, the upper about 8 cm. long and 4 cm. broad, pubescent when young, becoming rather thinly scabrid-pubescent; cymes rather small; calyx cupular, about 6 mm. long, deeply toothed; corolla up to 1·3 cm. long, lobes lanceolate .. .. .. .. .. .. 5. *yolense*

Inflorescence lateral, axillary, extra-axillary or leaf-opposed :

Indumentum stellate (always fairly copious) :

Flowers subsolitary to about 4 together, about 3 cm. diam. ; fruits exceeding 2 cm. diam. ; leaves ovate-elliptic, very variably lobate-dentate, up to about 22 cm. long and 14 cm. broad ; calyx up to 1·5 cm. long, lobes lanceolate ; corolla-lobes ovate, as long as the tube ; plants armed or unarmed, very variable .. 6. *incanum*

Flowers rather numerous, cymose (occasionally also a few solitary flowers), up to 2 cm. diam. ; fruits about 1 cm. diam. or less :

Leaves rather small, ovate, 2–7 cm. long, subentire ; cymes about 7 cm. long, lax ; calyx about 3 mm. long ; corolla 1·3 cm. long ; berry up to 1 cm. diam. ; plants prickly .. .. .. .. .. .. .. .. 7. *Heudelotii*

Leaves large, more or less elliptic, 10–16 cm. long, lobate-sinuate to subentire ; plants prickly or not :

Corolla about 1 cm. long ; cymes corymbose, very shortly pedunculate ; pedicels about 6 mm. long ; calyx 4 mm. long, lobes triangular .. .. 8. *torvum*

Corolla about 5 mm. long ; cymes raceme-like ; leaves very shortly pubescent above, subtomentose below .. .. .. .. .. 9. *anomalum*

Indumentum simple or absent or stellate hairs only on very young parts :

Leaves sessile or subsessile, the latter long-decurrent on the midrib at the base :

Calyx armed with long sharp bristles, very accrescent in fruit, the latter about 3 cm. diam. ; leaves elliptic-obovate in outline, pinnately lobed nearly to the middle, with prickles on the nerves, pilose on both surfaces .. .. 10. *duplosinuatum*

Calyx not armed and not accrescent in fruit, the latter 4 cm. diam. ; leaves less lobate than above and glabrous .. .. .. .. .. 11. *macrocarpon*

Leaves distinctly petiolate :

Plants armed with sharp prickles :

Berry 3 cm. diam. or more ; leaves pinnately lobed, shortly pubescent ; flowers subsolitary ; calyx-lobes pubescent, becoming prickly in fruit 12. *aculeatissimum*

Berry less than 1 cm. diam. ; flowers not subsolitary :

Inflorescence raceme-like ; pedicels spreading, about 1·5 cm. long in fruit ; leaves pilose, lobulate, often with a few prickles on the nerves .. .. 13. *indicum*

Inflorescence subfasciculate ; leaves glabrous or nearly so, with undulate margins 14. *Warneckeanum*

Plants unarmed :

Climber ; leaves elliptic, acuminate, entire, up to 12 cm. long and 8 cm. broad, glabrous or nearly so ; inflorescence few-flowered, subracemose 15. *inconstans*

Erect shrub ; branches mealy-pubescent ; leaves obovate-elliptic, hardly acuminate, up to 12 cm. long and 6 cm. broad, glabrous, undulate on the margin ; flowers subfasciculate on a short peduncle .. .. .. .. 16. *pauperum*

Herbs :

Plants pubescent ; stems slightly winged ; leaves ovate, subacute, up to 12 cm. long and 5 cm. broad, subentire ; inflorescence 4–6-flowered 17. *pseudospinosum*

Plants glabrous or nearly so :

Flowers umbellate on a common peduncle ; leaves ovate, shortly ciliate, entire or nearly so .. .. .. .. .. .. .. 18. *nodiflorum*

Flowers fasciculate, without a peduncle ; pedicels about 5 mm. long ; leaves lobulate, glabrous .. .. .. .. .. .. 19. *aethiopicum*

1. **Solanum clerodendroides** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. An undershrub with crowded shining leaves, and flowers in a thyrsoid panicle.
S. Nigeria : Eket ! Exsicc.—*Talb.* 3211.

2. **S. auriculatum** *Ait.* Hort. Kew. ed. 1, 1 : 246. A densely stellate tree or shrub up to 20 ft. high, with blue-purple flowers.
Cameroons Mt. : Buea, 3,500 ft. (Feb.–June) ! Native of the Mascarene Islands. Exsicc.—*Dalz.* 8207. *Maitland* 58. *Dunlap* 103. *Migeod* 242.

3. **S. verbascifolium** *Linn.*—F.T.A. 4, 2 : 221. An unarmed shrub, mealy-stellate-pubescent, with white flowers turning blue-purple.
Gold Coast : Krobo district ! S. Nigeria : Lagos ! In the tropics generally. Exsicc.—*Millen* 50. *Lloyd-Williams* 304. (See Appendix).

4. **S. Welwitschii** var. **strictum** *C. H. Wright*—F.T.A. 4, 2 : 213 ; Chev. Bot. 465. *S. Welwitschii* var. *oblongum* C. H. Wright. *S. Preussii* Damm. A glabrous climbing undershrub with blue-purple flowers with centre and stamens yellow.
French Guinea : Seredou, S.E. of Macenta (May) ! Guerzé country, Boola Mt., Ntongon, 1,200 ft. (Mar.) ! Lola to Nzo (Mar.) ! Gold Coast : Sutah ! Aburi (Nov.) ! Kunkuruntumi, Akim (Dec.) ! S. Nigeria : Ambas Bay (Feb.) ! Fernando Po ! Extends to Lower and Upper Congo Basin. Exsicc.—*Mann X.* 274. *Cummins* 45. *Johnson* 158 ; 268. *Collenette* 29.

5. **S. yolense** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Herbaceous undershrub with blue-purple flowers and yellow fruits $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter.
N. Nigeria : Yola, Giri (May) ! Exsicc.—*Dalz.* 183.

6. **S. incanum** *Linn.*—F.T.A. 4, 2 : 238 ; Holl. 3 : 483 ; Chev. Bot. 462. *S. Melongena* Linn. An undershrub 2–3 or up to 5 ft. high, pale stellate-tomentose all over, with flowers white and lilac-tinged or bluish-purple ; cultivated in various forms in Africa. Exsicc.—*T. Vogel* 52. *E. Vogel* 28. *Barter* (no number). *Rowland. Sc. Elliot* 4955. *Garrett* 22. *Dalz.* 92; 184 ; 387. *Debeaux* 151. (See Appendix).

7. **S. Heudelotii** *Dunal*—F.T.A. 4 2 : 224. An undershrub with slender branches and reflexed spines, shortly hoary-tomentose.
Senegal ! Exsicc.—*Heudelot* 417.

8. **S. torvum** *Swartz*—F.T.A. 4, 2 : 231 ; Chev. Bot. 465. A shrubby weed attaining 10 ft. or more in height, pale stellate-tomentose, with flattened spines, white or lilac flowers and berries ⅓ in. in diameter.

Sierra Leone : Hill Station (fr. Nov.) ! Tombo (Jan.) ! Ivory Coast : Bingerville, in waste places, old village sites, etc. ! N. Nigeria : Bauchi Plateau, Jos (June) ! S. Nigeria : Lagos (May) ! Victoria (Nov.)! Cameroons Mt., in clearings, 3,000–4,000 ft. (Jan.) ! Fernando Po (Dec.) ! Extends south to Angola. Exsicc. —*Mann* 55. *Dalz.* 1190. *Lely* 316. *Deighton* 229 ; 957. *Maitland* 88. *Dunlap* 104 ; 144. (See Appendix).

9. **S. anomalum** *Thonn.*—F.T.A. 4, 2 : 232 ; Stapf 636 ; Chev. Bot. 461. *S. distichum* Thonn.—Chev. Bot. 461. *S. scalare* C. H. Wright ; Chev. Bot. 465. *S. Schroederi* Dammer. *S. Naumannii* A. Chev. Bot. 463, not of Engl. *S. Buettneri* Dammer. A coarse tomentose undershrub up to a few feet high, with white or lilac flowers and erect red berries ⅓–½ in. in diameter.

Common in villages in waste places or cultivated ! Found in the tropics generally. Exsicc.—*T. Vogel* 13 ; 52 ; 83 ; 87. *Barter* 482. *Mann* 1165. *Millson. Rowland. Sc. Elliot* 4394 ; 4898 ; 5335b. *Brown* 320. *Whyte. Schlechter* 13004. *Schroeder* 92. *Chev.* 22124 ; 22274. *Buettner* 655. (See Appendix).

10. **S. duplosinuatum** *Klotzsch*—F.T.A. 4, 2 : 243 ; Holl. 3 : 482 ; Chev. Bot. 462. *S. cirsioides* A. Chev. Bot. 461. *S. macinae* A. Chev. Bot. 463. A coarsely hairy undershrub 2–3 ft. high, with bluish-purple flowers 1–1½ in. across, and smooth yellow fruit.

Gambia. Sierra Leone : Njala ! Ivory Coast : Middle Sassandra, Guideko ! Baoulé-Sud, between Toumodi and Nzaakro ! N. Nigeria : Nupe ! Lokoja ! Bauchi Plateau, Baradau, 3,000 ft. ! S. Nigeria : Lagos ! Lagos Colony ! Bobo-Awodi ! Obompa ! Ukunzu ! Throughout tropical Africa and in S. Africa. Exsicc.—*Barter* 1344. *Rowland. Dawodu* 37. *Foster* 347. *Dalz.* 186. *Lely* 91. *Deighton* 1804. *Chev.* 16437 ; 16462 ; 21817 ; 22423 ; 24680. (See Appendix).

11. **S. macrocarpon** *Linn.*—F.T.A. 4, 2 : 214 ; Chev. Bot. 463. Herbaceous undershrub with rather stout branches, glabrous except when young, and fairly large white or bluish-purple flowers ¾–1 in. across ; cultivated.

French Guinea : Farana, Tonfili ! Sierra Leone : several localities ! Ivory Coast : Agniéby Valley, Attéou, in forest plantations ! Baoule-Nord, Bouaké ! S. Nigeria : Lagos ! Also in E. Africa. Exsicc.—*Dalz.* 1189. *N. W. Thomas* 991 ; 1162 ; 1635 ; 2063. *Deighton* 1803 ; 1803A. (See Appendix).

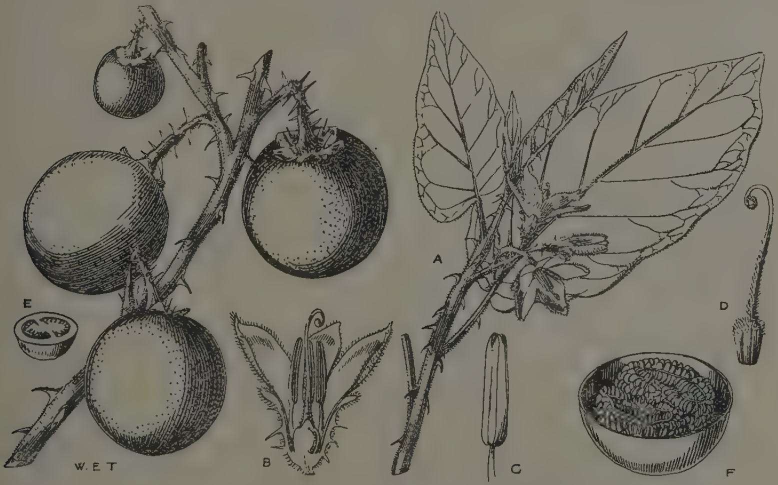

FIG. 249.—SOLANUM INCANUM *Linn.* (SOLANACEAE).

A, flowering shoot. B, longitudinal section of flower. C, anther. D, pistil. E, cross-section of ovary. F, section of fruit.

12. **S. aculeatissimum** *Jacq.*—F.T.A. 4, 2 : 228 ; Stapf 636 ; Chev. Bot. 460. An undershrub 1–2 ft. high, armed with nearly straight spines, with white flowers ½–¾ in. in diameter, and smooth orange-yellow nodding fruits.

French Guinea : Diaguissa Plateau ! Sierra Leone : Kanya (fr. Oct.) ! Yonibana (Oct.) ! Liberia : Kakatown ! Ivory Coast : Guidéko ! Yapo ! Tépo country, between Taté and Tabou ! Also in Prince's Island, Angola and Uganda. Exsicc.—*Whyte. N. W. Thomas* 2946 ; 4213.

13. **S. indicum** *Linn.*—F.T.A. 4, 2 : 232. Herbaceous undershrub 6–9 ft. high, loosely stellate-tomentose, with white or blue-purple flowers ½ in. in diameter, and red berries ¼–⅓ in. in diameter.

Cameroons Mt., 6,000–7,000 ft. (Nov.–Jan.) ! Fernando Po (Dec.) ! Also on mountains in Abyssinia and E. Africa, and in Angola ; through India to China and the Philippines. Exsicc.—*Mann* 625 ; 1322 ; 1975. *Dunlap* 31. *Mildbraed* 10811.

14. **S. Warneckeanum** *Dammer* in Engl. Bot. Jahrb. 38 : 186. Shrub 4–6 ft. high with branchlets densely stellate-tomentose at first, rather large flattened spines, and yellow-brown berries ¼–⅓ in. in diameter.

Togo : Lome, common ! S. Nigeria : Ibuzo ! Ukunzu ! Exsicc.—*Warnecke* 145. *N. W. Thomas* 1679 ; 2020 ; 2201.

15. **S. inconstans** *C. H. Wright*—F.T.A. 4, 2 : 211. *S. togoense* Dammer. A slender climbing undershrub, glabrous but pilose on the young lateral shoots, with blue-purple flowers.

Gold Coast : ? locality (Dec.) ! Togo : Badja (Mar.) ! Cameroons Mt., ? locality ! Fernando Po (Dec.) ! Also in Congo Basin. Exsicc.—*Mann* 62. *Eady. Kalbreyer* 172. *Schlechter* 12974.

16. **S. pauperum** *C. H. Wright*—F.T.A. 4, 2 : 217. A woody shrub with white flowers.

Gold Coast : Accra ! Newtown, near the beach (July) ! Also in Angola. Exsicc.—*Ansell. Chipp* 278.

17. **S. pseudospinosum** *C. H. Wright*—F.T.A. 4, 2 : 220. Herb, prostrate or ascending, sometimes slightly woody below, with small white flowers and violet-black berries.

Cameroons Mt., 7,000–9,000 ft. or higher (Dec.–Feb.) ! Exsicc.—*Mann* 1321 ; 1938. *Dalz.* 8335. *Mildbraed* 10888.

18. **S. nodiflorum** *Jacq.*—F.T.A. 4, 2 : 218 ; Holl. 3 : 484 ; Chev. Bot. 464. *S. guineense* Lam.—Chev. Bot. 462. *S. retroflexum* Dunal. A weed 1–2 ft. or more high, sometimes cultivated, with small white flowers and black berries $\frac{1}{4}$–$\frac{1}{3}$ in. in diameter.

Senegal and French Sudan to Cameroons ! Extends to Somaliland and E. Africa, Angola and S. Tropical Africa. Exsicc.—*Roger* 17. *Brunner*. *T. Vogel* 108. *Barter* 1054. *Dalz.* 1188 ; 1188a ; 1188b. *Dunlap* 2. *Chev.* 21 ; 2873 ; 15835 ; 28622. (See Appendix).

19. **S. aethiopicum** *Linn.*—F.T.A. 4, 2 : 217 ; Chev. Bot. 461. *S. darbanense* A. Chev. Bot. 461. *S. Pierreanum* Pailleux & Bois.—Chev. Bot. 464. A cultivated herb like the last.

French Guinea : Kankan ! Ivory Coast : Baoulé-Nord, Bouaké ! Dahomey : Zagnanado ! Savalou, Cabolé ! S. Nigeria : Obu ! Also in Upper Nile Land. Exsicc.—*N. W. Thomas* 146. *Chev.* 589 ; 22135 ; 22139 ; 23070 ; 23090 ; 23769. (See Appendix).

## 136. CONVOLVULACEAE

Herbaceous or woody, often climbing, juice usually milky. Leaves alternate, simple ; stipules absent. Flowers hermaphrodite, actinomorphic ; bracts often forming an involucre. Sepals usually free, imbricate, persistent. Corolla gamopetalous, mostly funnel-shaped, lobes 5, contorted. Stamens 5, inserted towards the base of the corolla-tube and alternate with the lobes ; anthers 2-celled, opening lengthwise. Ovary often surrounded by a disk, 1–4-celled ; ovules solitary or paired, erect ; style terminal. Fruit a capsule or fleshy and indehiscent. Seeds sometimes hairy, with rather scanty endosperm and more or less curved embryo. Cotyledons folded or crumpled.

A widely distributed family, mainly in warmer regions ; flowers very delicate and often fugitive.

Leafy plants, not parasitic :
Pollen grains smooth :
Sepals (or some of them) much enlarged in fruit ; bracts not enlarged 1. **Prevostea**
Sepals not enlarged in fruit :
Bracts enlarged in fruit .. .. .. .. .. .. 2. **Neuropeltis**
Bracts not enlarged in fruit :
Styles 2, or single and rather deeply bilobed :
Small herbs with very small flowers :
Styles 2, forked .. .. .. .. .. .. .. ..3. **Evolvulus**
Styles 2, not forked .. .. .. .. .. .. .. 4. **Cressa**
Shrubby climbers ; style with 2 unequal branches with globose stigmas 5. **Bonamia**
Style 1, entire or slightly lobed :
Outer sepals not much larger than the inner :
Stigma linear-filiform .. .. .. .. .. .. 6. **Convolvulus**
Stigma elliptic .. .. .. .. .. .. .. 7. **Jacquemontia**
Stigma biglobular .. .. .. .. .. .. 8. **Merremia**
Outer sepals conspicuously larger than the inner :
Stigmas 2, ovate-oblong ; capsule globose .. .. .. .. 9. **Hewittia**
Stigma biglobular ; capsule ovoid .. .. .. .. .. 10. **Aniseia**
Pollen-grains spinose :
Fruit a capsule :
Stamens inserted at the base of scales .. .. .. .. 11. **Lepistemon**
Stamens not attached to scales :
Pedicels accrescent .. .. .. .. .. .. .. 12. **Calonyction**
Pedicels not accrescent :
Indumentum stellate ; erect shrubs .. .. .. .. 13. **Astrochlaena**
Indumentum absent or if present then not stellate ; climbers :
Corolla hypocrateriform ; stamens and style exserted ; ovary 4-celled 14. **Quamoclit**
Corolla and other characters never associated .. .. 15. **Ipomoea**
Fruit fleshy and indehiscent ; cymes few-flowered and subsessile ; leaves long-petiolate .. .. .. .. .. .. .. .. 16. **Stictocardia**
Leafless parasitic plants with filiform stems and clusters of small flowers .. 17. **Cuscuta**

### 1. PREVOSTEA Choisy—F.T.A. 4, 2 : 81.

Leaves very shortly acuminate or not acuminate, ovate or ovate-elliptic, rounded at the base, 8–14 cm. long, 5–8 cm. broad, glabrous, pitted in the axils of the 4–7 pairs of lateral nerves ; petiole 2–2·5 cm. long, glabrous ; cymes several-flowered ; sepals softly tomentose ; corolla 2·5 cm. long, the 5 lobes slightly pubescent outside ; style-arms unequal; two sepals in fruit very unequal, one twice as large as the other, orbicular, cordate at the base, the larger about 5 cm. diam., venose 1. *Heudelotii*

Leaves rather long- to long-acuminate:

Corolla 1·5 cm. long or more:

Petiole tomentose; leaves shortly and broadly narrowed at the base, obovate-elliptic, about 15 cm. long, 7 cm. broad, with 7–8 pairs of lateral nerves not pitted in their axils; pedicels pubescent; two sepals in fruit orbicular, one two-thirds as large as the other, the larger 5 cm. diam. .. .. .. .. .. .. 2. *insignis*

Petiole slightly pubescent, 1 cm. long; leaves oblong-oblanceolate, long-tailed-acuminate, gradually narrowed from above the middle to the obtuse base, 10–15 cm. long, 3–6 cm. broad, minutely glandular-punctate below, with 8–10 pairs of prominently looped lateral nerves; corolla 2 cm. long, very shortly lobed; two sepals in fruit very unequal, broadly ovate-orbicular, slightly pointed, one less than $\frac{1}{3}$ as large as the other, the larger 7 cm. long .. .. .. .. 3. *africana*

Corolla 1 cm. long; leaves oblong-elliptic, broadly acuminate, rounded at the base, 7–10 cm. long, 3–4·5 cm. broad, with about 8 pairs of lateral nerves prominently looped, minutely pubescent on the nerves below; petiole pubescent, nearly 1 cm. long .. .. .. .. .. .. .. .. .. 4. *micrantha*

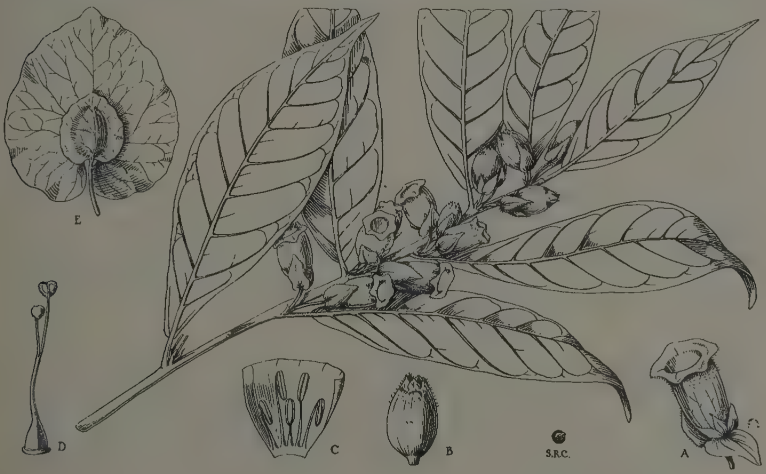

FIG. 250.—PREVOSTEA AFRICANA *Benth.* (CONVOLVULACEAE).

A, flower. B, corolla in bud. C, open lower part of corolla. D, pistil. E, fruit.

1. **Prevostea Heudelotii** *Hall. f.*—F.T.A. 4, 2 : 83; Stapf 634; Chev. Bot. 459. *Breweria Heudelotii* Baker. A woody climbing shrub, glabrous, with shining leaves and white flowers 1 in. long having, in fruit, two large papery net-veined sepals.
Senegal to Sierra Leone: common! Liberia: Kakatown! S. Nigeria: Lagos, Ikoyi (Feb., Mar.)! Exsicc.—*Heudelot* 864. *Sc. Elliot* 4866; 5018; 5230. *Whyte.* *Dalz.* 1069.

var. **minor** *Rendle*—F.T.A. 4, 2 : 83. Corolla about $\frac{3}{4}$ in. long, narrower, with less spreading lobes.
Gold Coast: Aburi Hills (Feb.)! Dodowah (Jan.)! Kumasi (Dec.)! Exsicc.—*Johnson* 585; 614. *Dalz.* 121.

2. **P. insignis** *Rendle*—F.T.A. 4, 2 : 571. A shrub, slightly brown-pubescent on the branchlets, with large membranous veined sepals, sometimes purple-tinged, in fruit (flowers not seen); inflorescence terminal.
Liberia: Kakatown! Exsicc.—*Whyte.*

3. **P. africana** *Benth.*—F.T.A. 4, 2 : 82; Chev. Bot. 459. A woody climber with pubescent branchlets becoming glabrous, and white flowers $\frac{2}{3}$–$\frac{3}{4}$ in. long.
Sierra Leone: Kafogo, Limba (Apr.)! Freetown or ? locality! Ivory Coast: Malamalasso! Gold Coast: W. Ashanti, Kunso (Feb.)! S. Nigeria: Lagos! Oban! Extends to Spanish Guinea. Exsicc.—*Don.* *Moloney.* *Sc. Elliot* 5518. *Chipp* 110.

4. **P. micrantha** *Dam.*—F.T.A. 4, 2 : 82. A shrub 7–9 ft. high, with densely puberulous branchlets when young, and comparatively small white flowers $\frac{1}{2}$ in. long, few together on short axillary peduncles sometimes below the leaves.
S. Nigeria: Johann-Albrechtshöhe! Exsicc.—*Staudt* 637.

*Imperfectly known species.*

**P. nigerica** *Rendle* in Cat. Talb. Nig. Pl. 72.
S. Nigeria: Oban! Exsicc.—*Talb.* 1484. Leaves not known.

### 2. NEUROPELTIS Wall.—F.T.A. 4, 2 : 80.

Branchlets terete, minutely puberulous; leaves oblong-elliptic, broadly acuminate, acumen long-apiculate, rounded or broadly cuneate at the base, 6–12 cm. long, 2·5–6 cm. broad, puberulous only on the midrib below; lateral nerves about 5 pairs; flowers in slender panicles with long straggly raceme-like branches; calyx-lobes elliptic, 2 mm. long; corolla deeply 5-lobed; lobes 3·5 mm. long; stamens exserted; fruit ovoid, 7 mm. long, near the middle of the enlarged orbicular membranous bract about 5 cm. diam. *acuminata*

**Neuropeltis acuminata** *Benth.*—F.T.A. 4, 2 : 80. A climbing shrub with shining leaves and small white flowers in narrow racemes 3–6 in. long forming a panicle, with a large papery veined bract in fruit.

Senegal: Casamance, Sinédone! French Guinea: Kouria, etc.! Sierra Leone: Mano! Gold Coast: Kumasi (Dec.)! S. Nigeria: Warri. Victoria (Jan.)! Also in French Cameroons. Exsicc.—*Smythe* 119. *Vigne* 194. *Kalbreyer* 11.

### 3. **EVOLVULUS** Linn.—F.T.A. 4, 2 : 66.

Annual, branched from the base; branches elongated, spreading, long-pilose; leaves narrowly lanceolate, very acute, about 2 cm. long, densely appressed-pilose; flowers paired on a slender axillary peduncle; calyx-segments subulate-lanceolate, 3 mm. long, pilose; corolla small; capsule globose, dry and shining; seeds black 1. *alsinoides*

Perennial herb with procumbent stems rooting at the nodes; leaves orbicular, about 8–10 mm. diam., glabrous; flowers solitary, axillary; capsule globose, about 3 mm. diam. .. .. .. .. .. .. .. .. .. 2. *nummularius*

1. **E. alsinoides** *Linn.*—F.T.A. 4, 2 : 67; Holl. 3 : 473; Chev. Bot. 458. A tufted or spreading hairy herb: woody at the base, with sky-blue funnel-shaped flowers ½ in. across.

Senegal to N. Nigeria, common in savannah! A common tropical and subtropical plant. Exsicc.—*Roger* 12. *Heudelot* 229. *T. Vogel* 159. *Ansell.* *Barter* 546. *Warnecke* 212. (See Appendix).

2. **E. nummularius** *Linn.*—F.T.A. 4, 2 : 68; Chev. Bot. 458. Flowers white.

Ivory Coast: Mankono, banks of Bandama, near Marabadiassa (July)! Uganda, E. Africa and Angola, and in tropical America. Exsicc.—*Chev.* 22012.

### 4. **CRESSA** Linn.—F.T.A. 4, 2 : 72.

A much-branched herb; branchlets dense, pubescent; leaves ovate, sessile, subacute, 5–6 mm. long, thinly pilose; flowers subsessile, crowded at the tops of the branchlets, the latter forming a panicle; calyx campanulate, pubescent; corolla 4–5 mm. long, lobes sharply reflexed; stamens exserted; stigma capitate; fruit ovoid, shortly beaked, slightly nerved, 4 mm. long, glabrous; seed ovoid, dark brown *cretica*

**C. cretica** *Linn.*—F.T.A. 4, 2 : 72; Chev. Bot. 459. Stems woody below, slender, spreading or ascending from a few inches to 1 ft. long; in damp sandy places, especially near the sea.

Senegal: Dakar! Niayes, etc.! (Oct.–Jan.)! Also in Mauritania, and widely spread in both hemispheres. Exsicc.—*Leprieur.* *Roger* 73. *Chev.* 2906; 15812.

### 5. **BONAMIA** Thouars—F.T.A. 4, 2 : 78.

Stems twining, pubescent; leaves oblong-ovate, mucronate, rounded at the base, 4–6 cm. long, 2–3·5 cm. broad, glabrous or nearly so above, appressed-silky-tomentose below to nearly glabrous, with about 8 pairs of lateral nerves impressed above, prominent below; petiole 1 cm. long; flowers in shortly pedunculate axillary cymes; pedicels tomentose, about 1 cm. long; calyx-segments ovate, acuminate, about 8 mm. long, tomentose; corolla 2 cm. long, pilose outside; fruit ovoid, apiculate, 1 cm. long; seeds black, glabrous .. .. .. .. .. .. .. *cymosa*

**B. cymosa** *Hall. f.*—F.T.A. 4, 2 : 79; Stapf 634; Chev. Bot. 459. A woody climber and twiner, with wrinkled leaves brown-ochry below, and rather small white flowers ⅜ in. long in dense cymes forming one-sided panicles.

Gambia! Senegal: Casamance, Sinédone! French Guinea: Kouria and district! Sierra Leone: common! Liberia: Monrovia and Kakatown! Dukwia R.! Gold Coast: Assin Yan Kumasi! S. Nigeria: Lagos, Ikoyi, etc. (Dec.)! Oban! Barombi. Also in French Cameroons. Exsicc.—*Don.* *Barter* 2167; 2227. *Ingram.* *Sc. Elliot* 3930; 5599; 5835. *Millen* 34. *Cummins* 165. *Whyte.* *Dalz.* 1157. *Talb.* 88; 1535. *G. P. Cooper* 220.

### 6. **CONVOLVULUS** Linn.—F.T.A. 4, 2 : 88.

Leaves linear-oblanceolate, acute at the base, rounded and mucronate at the apex, 2–3 cm. long, 3–6 mm. broad, pilose; flowers solitary or paired in the leaf-axils; calyx-segments lanceolate, acuminate, 8 mm. long, densely pilose; corolla 1 cm. long 1. *pluricaulis*

Leaves lanceolate, hastate-lobulate at the base, about 4 cm. long, shortly pubescent; flowers paired on a common peduncle; calyx-segments about 8 mm. long, setulose; corolla 1·3–1·5 cm. long .. .. .. .. 2. *sagittatus* var. *abyssinicus*

1. **C. pluricaulis** *Choisy*—F.T.A. 4, 2 : 91. Stems slender, rusty-pilose, from a woody stock, erect or spreading, with whitish shortly funnel-shaped flowers ⅓ in. long.

Senegal! Also in N. India. Exsicc.—*Heudelot* 403.

2. **C. sagittatus** var. **abyssinicus** *Hall. f.*—F.T.A. 4, 2 : 96. Stems prostrate, grey-greenish, pubescent, with pink-purplish or shite flowers ½ in. long.

N. Nigeria: Bauchi Plateau, plains between Hepham and Ropp, 4,600 ft. (July)! Extends to E. Sudan, Abyssinia, Ngamiland and Angola. Exsicc.—*Lely* 362.

### 7. **JACQUEMONTIA** Choisy—F.T.A. 4, 2 : 85.

Flowers subumbellate, few; pedicels about 1 cm. long, slender; bracts subulate; leaves oblong-lanceolate, rounded at the apex or emarginate, 3–4 cm. long, 1–2·5 cm.

broad, entire, glabrous ; calyx-segments ovate, 0·5 cm. long ; corolla twice as long as the calyx ; fruit shorter than the calyx .. .. .. .. .. 1. *ovalifolia*

Flowers capitate, surrounded by leafy bracts ; leaves broadly ovate, acuminate, cordate to rounded at the base, up to 8 cm. long and 5·5 cm. broad, glabrous or nearly so below ; calyx-segments 1 cm. long, linear-lanceolate, long-pilose with brown hairs ; corolla twice as long as the calyx .. .. .. .. .. .. 2. *capitata*

1. **Jacquemontia ovalifolia** *Hall. f.*—F.T.A. 4, 2 : 87. Prostrate and ascending from a half-woody base, glabrous, with pale blue flowers ½ in. long.

Gold Coast : Accra, common in sand near the beach (June, Oct.) ! Cape Coast. Togo : Lome ! Extends to Somaliland, E. Africa and to Angola. Exsicc.—*T. Vogel* 11. *Brown* 374. *Dalz.* 8. *Irvine* 668 ; 689. *Warnecke* 254.

2. **J. capitata** *G. Don*—F.T.A. 4, 2 : 85 ; Chev. Bot. 457. A slender twiner, pilose, with blue flowers.

French Sudan : San ; Télé ; Sompi. Senegal : Richard Tol, etc. ! Liberia : Cape Palmas (July) ! Gold Coast : Accra and environs (Jan., May) ! Togo : Lome ! Dahomey ! N. Nigeria : Lokoja ! Jebba ! Sokoto (Nov.) ! Katagum (Sept.) ! Bornu, Maigumeri (Nov.) ! In tropical and S. Africa and the Mascarene Islands. Exsicc.—*Roger. T. Vogel* 38. *Ansell. Barter* (no number). *Burton. Elliott* 130. *Farmar* 38. *Warnecke* 243. (See Appendix).

## 8. **MERREMIA** Dennst.—F.T.A. 4, 2 : 101.

Leaves deeply pinnatipartite, up to 4 cm. long, segments linear, thinly pilose ; peduncles axillary, 2–3 cm. long, pilose, 1–3-flowered ; calyx-segments with long linear points ; corolla narrowly funnel-shaped, a little longer than the calyx ; fruit globose, pilose 1. *pinnata*

Leaves not pinnately divided :

Leaves linear-lanceolate or linear, usually hastately-lobulate or toothed at the base, subsessile, 3–5 cm. long, glabrous ; peduncles slender, axillary, 1–3-flowered, bracteate towards the top ; calyx-segments 5 mm. long, mucronate ; corolla 1·5 cm. long ; fruit ovoid-globose, about 8 mm. long .. .. 2. *angustifolia*

Leaves neither linear nor lanceolate :

Leaves more or less ovate, entire or 3-lobed to the middle :

Corolla less than 1 cm. long ; calyx-segments dry and chaffy, 6 mm. long, obovate-elliptic ; pedicels very short ; leaves small, mostly shortly trilobed ; fruit quadrangular-globose, about 8 mm. diam., glabrous .. .. .. 3. *hederacea*

Corolla 3 cm. long ; calyx segments 1 cm. long, leathery ; pedicels 1·5 cm. long ; leaves broadly ovate, deeply cordate, about 12 cm. long and 7–10 cm. broad, glabrous or pubescent on the midrib below ; fruit 1·5 cm. long ; seeds covered with short hairs .. .. .. .. .. .. .. .. 4. *umbellata*

Leaves deeply divided :

Stems and pedicels winged ; leaves divided to the base into 5 obovate-oblanceolate segments about 10 cm. long and 4·5 cm. broad ; calyx-segments broadly elliptic, 2 cm. long ; fruit ovoid, 2·5 cm. long ; seeds glabrous .. .. 5. *alata*

Stems and pedicels not winged ; or rarely the stems winged :

Calyx-segments and branchlets densely covered with long slender hairs ; leaves divided completely to the base into 5 obovate acutely acuminate segments up to 8 cm. long and 4 cm. broad ; calyx-segments 1·5–2 cm. long in flower, increasing to 3 cm. in fruit ; corolla 2–2·5 cm. long ; seeds glabrous .. 6. *pentaphylla*

Calyx-segments glabrous ; branchlets usually glabrous :

Calyx 2–3 cm. long :

Segments of the leaves sinuate-dentate, acute, 7–10 cm. long, lanceolate ; stems and often the petioles usually with long slender hairs ; corolla 3·5 cm. long ; fruit ovoid, 1·5 cm. long ; seeds glabrous .. .. .. .. 7. *dissecta*

Segments of the leaves nearly entire, acute, 7–9 cm. long, oblanceolate ; stems and petioles glabrous ; corolla about 5 cm. long .. .. 8. *kentrocaulos*

Calyx up to about 1 cm. long :

Leaves digitately lobed ; stems winged in the lower part ; leaf-segments variable, from linear- to broadly-lanceolate, long-mucronate, up to 10 cm. long and 3 cm. broad, pubescent towards the base of the principal nerves below ; corolla-lobes densely setose in bud .. .. .. .. 9. *pterygocaulos*

Leaves subpinnately divided with 2 lobes on each side, the terminal lobe linear-lanceolate, 5–6 cm. long, thinly pilose on the nerves below ; peduncle densely pubescent, short ; pedicels 5 mm. long ; calyx 8 mm. long 10. *Pes-draconis* var. *nigerica*

1. **Merremia pinnata** *Hall. f.*—F.T.A. 4, 2 : 113 ; Chev. Bot. 458. Annual, trailing and twining, with slender loosely hairy stems, and cream-white flowers ⅓–½ in. long mostly hidden by the hairy calyx.

French Sudan : San ; Koulikoro ; Sompi. Senegal and Gambia : fairly common ! Sierra Leone : Kitchom (Dec., Jan.) ! Bullom ! Juring (Dec.) ! N. Nigeria : Jebba ! Sokoto (Sept., Dec.) ! Bauchi Plateau, Naraguta (Sept.) ! Extends to E. Sudan and south to Ngamiland. Exsicc.—*Thierry* 18. *Barter* (no number). *Ingram. Brown-Lester* 79. *Sc. Elliot* 4337. *Farmar* 154. *Dalz.* 377. *Lely* 635.

2. **M. angustifolia** *Hall. f.*—F.T.A. 4, 2 : 111 ; Chev. Bot. 457. A glabrous annual, prostrate and twining amongst grass, etc., with pale yellow funnel-shaped flowers.

Common chiefly in savannah regions ! In tropical Africa generally, and in S. Africa. Exsicc.—*T. Vogl.* 55 ; 112. *Skues. Barter* 1266. *Sc. Elliot* 4052. *Brown* 350. *Farmar* 363. *Dawodu* 375 ; 379. *Table* 834. *Warnecke* 35. (See Appendix).

3. **M. hederacea** *Hall. f.* in Engl. Bot. Jahrb. 18 : 118. *Evolvulus hederaceus* Burm. f. Fl. Ind. 77, t. 30, fig. 2. *M. convolvulacea* Dennst.—F.T.A. 4, 2 : 114 ; Chev. Bot. 457. A nearly glabrous twiner and climber, the stems often red-purple-tinged, with rather small yellow flowers.

Senegal : Richard Tol (Jan.) ! Sierra Leone : Mofari, Scarcies (Jan.) ! Ivory Coast : Makougnié ! N. Nigeria : Nupe ! Kontagora (Nov.) ! Katagum (Oct.) ! Kumu (Oct.) ! Extends to Angola and E. Africa ; also in the Eastern tropics. Exsicc.—*Roger* 117. *Barter* 885. *Sc. Elliot* 4433. *Dalz.* 119. *Lely* 668. *Chev.* 16964.

4. **M. umbellata** *Hall. f.*—F.T.A. 4, 2 : 106 ; Chev. Bot. 458. *Ipomoea oenotheriflora* A. Chev. Bot. 455, name only. A perennial twiner, glabrous or sparingly hairy, with sulphur-yellow funnel-shaped flowers in umbellate cymes on a peduncle 2–6 in. long.

Common in swampy places, by streams, etc., from Senegal to Nigeria and Fernando Po ! Also in E. Africa and in tropical America. Exsicc.—*Don.* *T. Vogel* 54. *Skues.* *Barter* 1838. *Mann* 85. *Sc. Elliot* 4324. *Garrett* 27. *Whyte.* *Dalz.* 77 ; 8136. *Chipp* 59. *Chev.* 20391.

5. **M. alata** *Rendle*—F.T.A. 4, 2 : 102. A stout glabrous climber with winged hollow stems, and widely funnel-shaped white flowers 2–2½ in. long and 3 in. across.

Gold Coast : Odumase (Oct.) ! Krobo Plains (Dec.) ! Takoradi (Oct.) ! Togo : Lome (Nov.) ! Exsicc.—*Johnson* 155 ; 517. *Howes* 979. *Warnecke* 273. *Mildbraed* 7502.

6. **M. pentaphylla** *Hall. f.*—F.T.A. 4, 2 : 108 ; Chev. Bot. 457. A robust annual twiner, hirsute, with campanulate-funnel-shaped white flowers 1 in. long, the buds covered with spreading yellowish hairs.

Senegal to N. and S. Nigeria ! In the tropics generally. Exsicc.—*Roger* 94. *Döllinger* 8. *Barter* 863. *Sc. Elliot* 4060 ; 4869. *Millen* 118. *Farmar* 36. *Foster* 155. *Dalz.* 132 ; 184. *Debeaux* 314. *Warnecke* 275. (See Appendix).

7. **M. dissecta** *Hall. f.*—F.T.A. 4, 2 : 104. A perennial twiner, the stems, etc., at first coarsely hirsute, becoming glabrous, with widely funnel-shaped flowers 1½ in. long, white with purple throat, opening in the evening.

Gold Coast : Achimota (cultivated) ! Lagos ! Fernando Po (Nov.) ! Native probably of America, now cosmopolitan in the tropics. Exsicc.—*T. Vogel* 238. *Cons. of Forests, Lagos* 472. *Irvine* 1107.

8. **M. kentrocaulos** *Rendle*—F.T.A. 4, 2 : 103. A glabrous perennial twiner, with widely funnel-shaped flowers 2–2½ in. long, cream-white with dark purple centre.

N. Nigeria : Nupe ! South of Bauchi Plateau, 2,500 ft. (Nov.) ! Extends to E. Sudan and Angola. Exsicc.—*Barter* 930. *Lamb* 78.

9. **M. pterygocaulos** *Hall. f.*—F.T.A. 4, 2 : 105. *Ipomoea hydrosmifolia* A. Chev. A perennial twiner with glabrous acutely-angled stems, and campanulate flowers about 1½ in. long, white, occasionally yellow, with a purple or red ring in the throat ; by swamps and streams.

French Guinea : Farana, Kaba to Tonfili ! Gambia : Kudang (Jan.) ! Sierra Leone : Kukuna, Scarcies (Jan.) ! Kaballa (Sept.) ! Hanga (Jan.) ! Mano (Mar.) ! N. Nigeria : Kontagora (Dec.) ! Bagega (Dec.) ! Katagum ! Bauchi Plateau, Naraguta (Nov.) ! Vom, 3,000–4,500 ft. ! S. Nigeria : Abokom-Ikura (Jan.) ! Fernando Po. In tropical Africa generally and the Mascarene Islands. Exsicc.—*Sc. Elliot* 4507 (in part). *Holl.* 256. *Dalz.* 121 ; 313 ; 8049. *Lely* 709. *Dent Young* 182. *Chev.* 20397.

10. **M. Pes-draconis** var. **nigerica** *Rendle* in Cat. Talb. Nig. Pl. 73. A rather slender twiner, covered with dull yellowish pubescence, with 7-lobed leaves and ? yellow flowers ¾ in. long.

N. Nigeria : R. Benue ! Exsicc.—*Talb.* 832.

## 9. **HEWITTIA** Wight & Arn.—F.T.A. 4, 2 : 100.

Stems twining ; leaves ovate to triangular-ovate, mucronate, cordate at the base, up to 12 cm. long and 9 cm. broad, thinly pubescent on the nerves below ; flowers few in a bracteate head on an axillary peduncle ; bracts ovate or ovate-lanceolate, green, about 1 cm. long, pubescent ; calyx-segments ovate-lanceolate, 1 cm. long ; corolla densely pilose in bud, 2·5 cm. long ; fruit subglobose .. .. .. *sublobata*

**H. sublobata** *O. Ktze* Rev. Gen. Pl. 441. *Convolvulus sublobatus* Linn. f. *H. bicolor* Wight—F.T.A. 4, 2 : 100. Herbaceous twiner, pubescent, with flowers 1 in. long, cream-white or pale yellow with deep purple centre and leafy bracts and calyx.

Gambia : south bank ! Sierra Leone : Bathurst (Dec.) ! Kaballa (Sept.) ! Kumrabai (Dec., Jan.) ! Yungeru (Jan.) ! Makump (Dec.) ! Liberia : Cape Palmas (July) ! Ivory Coast : Bingerville ! Gold Coast : Ashanti, Agogo (Dec.) ! ? locality ! Togo. S. Nigeria : Lagos, Ikoyi, etc. ! (Oct.). Iju Waterworks ! Abeokuta ! Aguku ! Oban ! Rio del Rey ! Tropical Africa, Asia and Polynesia. Exsicc.—*T. Vogel* 14 ; 59. *Barter* 2160 ; 3351. *Irving* 120. *Brown-Lester* 26. *Sc.Elliot* 4111. *Cummins* 40. *Johnston* 44. *Millen* 76. *Dalz.* 1158. *Talb.* 798. *Chev.* 17333.

## 10. **ANISEIA** Choisy—F.T.A. 4, 2 : 88.

Stems twining, soon nearly glabrous ; leaves oblong-lanceolate, rounded at the apex and long-mucronate, up to 9 cm. long and 2·5 cm. broad, glabrous or slightly pubescent ; petiole up to 2·5 cm. long ; flowers usually solitary, on rather long axillary peduncles ; bracts subulate, a little below the ovate-lanceolate acute sepals, the latter about 1·5 cm. long ; corolla about 3 cm. long, pilose outside ; fruit 2 cm. long *martinicensis*

**A. martinicensis** *Choisy* in Mém. Soc. Phys. Genève 8 : 144. *Convolvulus martinicensis* Jacq. *A. uniflora* Choisy—F.T.A. 4, 2 : 88 ; Chev. Bot. 456. A slender twiner, thinly pubescent at first, with white flowers 1 in. long with leafy sepals.

Senegal ! French Guinea : Kouria ! Sierra Leone : various localities, common amongst grass ! Liberia : Kakatown ! Dukwia R. (Oct.) ! Ivory Coast : Lower Comoé, Abradine ! Bliéron, mouth of Cavally R. ! N. Nigeria : Benue R., Loko (Nov.) ! S. Nigeria : Lagos, Ikoyi (Mar.) ! Abeokuta ! Ndoni ! In the tropics generally. Exsicc.—*Roger* 38. *Barter* 1771 ; 3340. *Sc. Elliot* 4051 ; 5271 ; 5696. *Garrett* 25. *Whyte.* *Dalz.* 74 ; 1354 ; 8046. *G. P. Cooper* 9. *Chev.* 14665 ; 17587 ; 19910.

## 11. **LEPISTEMON** Blume—F.T.A. 4, 2 : 115.

Flowers rather few, subfasciculate ; stems long-pilose with reflexed hairs ; leaves very broadly ovate, widely cordate at the base, mucronate at the apex, up to about 15 cm. long, entire or sinuately lobed or dentate ; pedicels 1–1·5 cm. long, setulose-pubescent ; calyx-segments ovate, 7 mm. long ; corolla 2·5–3 cm. long, broadly funnel-shaped, wider towards the base ; fruit densely bristly .. .. .. 1. *owariense*

Flowers numerous, in short cymes ; stems glabrous ; leaves as above but smaller, appressed-pilose on the upper surface ; pedicels 1 cm. long, glabrous ; calyx-segments 5 mm. long ; corolla 1 cm. long .. .. .. .. .. 2. *parviflorum*

1. **L. owariense** *Hall. f.* in De Wild. Etudes Fl. Katanga 112. *Ipomoea owariensis* Beauv. Fl. Owar. 2 : 41, t. 82. *L. africanum* Oliv. in Hook. Ic. Pl. t. 1270—F.T.A. 4, 2 : 115. A robust twiner clothed with almost pungent hairs, with white flowers about 1 in. long in short axillary cymes.
Gold Coast : Anum (Nov.) ! Prahsu ! Togo. N. Nigeria : Lokoja, ravine of Patti (Nov.) ! Kabba (Oct.) ! S. Nigeria : Ebute Metta ! Lagos Colony ! Extends to E. Sudan, E. Africa, and south to Angola. Exsicc.—*Cummins* 1. *Millen* 33 ; 68 ; 180. *Rowland.* *Johnson* 817. *Dalz.* 195.
2. **L. parviflorum** *Pilger* in Mitth. Deutsch. Schutzgeb. 23, 2 : 87. A slender twiner with smaller and more numerous flowers than the last.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.* 1289.

## 12. **CALONYCTION** Choisy—F.T.A. 4, 2 : 117.

Corolla narrowly tubular up to the limb ; tube 8–10 cm. long, glabrous outside ; limb ample, spreading ; leaves widely ovate, openly cordate at the base, very acutely acuminate, about 15 cm. long and 12 cm. broad, thin, glabrous ; petiole up to 15 cm. long ; calyx-segments elliptic, with a long decurrent acumen ; fruit 2·5 cm. long 1. *aculeatum*

Corolla expanding in the upper part well below the limb ; tube 5–6 cm. long, glabrous ; leaves as above ; peduncle becoming very thick in fruit .. .. 2. *muricatum*

1. **C. aculeatum** *House* in Bull. Torr. Bot. Club 31 : 590. *Convolvulus aculeatus* Linn. *Ipomoea Bona-nox* Linn. *Calonyction speciosum* Choisy—F.T.A. 4, 2 : 117 ; Holl. 3 : 474 ; Chev. Bot. 457. A strong twiner with stems smooth or sparingly tubercled, and large white flowers 4–6 in. across the limb, expanding and fragrant at night ; wild but often cultivated for ornament.
Senegal. French Guinea : Kouria. Sierra Leone : various localities ! Gold Coast : Krepi Plains (Jan.) ! N. Nigeria : Benue R., bank below Ibi (Nov.) ! S. Nigeria : Lagos and Lagos Colony ! Oshogbo ! Lower Niger, Ibo (Aug.) ! Ogwashi (Dec.) ! Calabar R. (Feb.) ! Oban ! Barombi. Widespread in the tropics. Exsicc.—*T. Vogel* 38. *Mann* 2324. *Millson* 43. *Sc. Elliot* 4344 ; 5444. *Millen* 88. *Johnson* 548. *Dalz.* 73. *Talb.* 825. (See Appendix).
2. **C. muricatum** *G. Don*—F.T.A. 4, 2 : 118 ; Holl. 3 : 473 ; Chev. Bot. 456. *Ipomoea muricata* Jacq. Hort. Schoenbr. 3 : 40, t. 323. A strong climber like the last with tubercled stems and funnel-shaped flowers, white or reddish or lilac.
Senegal : Pont (Dec.). Gambia ! Sierra Leone : Mahela, Samu (Dec.) ! N. Nigeria : Sokoto, on fences in the town (Aug.) ! S. Nigeria : Lagos ! In the tropics generally. Exsicc.—*Ingram.* *Sc. Elliot* 4074. *Dawodu* 257. *Dalz.* 372. (See Appendix).

## 13. **ASTROCHLAENA** Hall. f.—F.T.A. 4, 2 : 118.

Calyx-segments not keeled, ovate, about 1 cm. long in fruit, stellate-tomentellous ; flowers few on a very short common peduncle ; corolla about 1·5 cm. long, with a narrow purple throat ; leaves broadly ovate, entire or repand-undulate, truncate or rounded at the base, up to 12 cm. long and 9 cm. broad, loosely stellate-pubescent on both surfaces ; fruit 1 cm. long, glabrous .. .. .. .. 1. *lachnosperma*

Calyx-segments keeled, broadly lanceolate, 1 cm. long, stellate-tomentellous ; flowers few on a long common peduncle ; corolla 5 cm. long, gradually widened from the middle upwards ; leaves ovate, acute, rounded at the base, mucronate, 7–9 cm. long, 5–6 cm. broad, thinly stellate-pubescent above, more densely so below 2. *malvacea*

1. **A. lachnosperma** *Hall. f.*—F.T.A. 4, 2 : 119. Erect perennial herb, woody below, 1–2 ft. high, covered with yellowish stellate tomentum, with funnel-shaped flowers ¾ in. long, white with red-purple centre.
N. Nigeria : Sokoto (Aug.) ! Hadeijia (Sept.) ! Katagum ! Bornu, Kuka. Extends to Eritrea and to S. Tropical Africa. Exsicc.—*Dalz.* 182 ; 371.
2. **A. malvacea** *Hall. f.*—F.T.A. 4, 2 : 121. Habit of the last, 2–3 ft. high, hoary-stellate-tomentose, with red-purple flowers 1½–2 in. long.
N. Nigeria : Yola (June, Oct.) ! Also in S. Tropical and S. Africa. Exsicc.—*Dalz.* 72. *Shaw* 104.

## 14. **QUAMOCLIT** Moench.—F.T.A. 4, 2 : 127.

Leaves entire to trilobed, very broadly ovate, acuminate, widely cordate at the base, up to 15 cm. long and broad, glabrous ; flowers in dichotomous cymes ; pedicels about 6 mm. long ; calyx-segments oblong-elliptic, long-acuminate ; corolla narrowly tubular, 4·5 cm. long, with spreading limb ; fruit broadly ovoid-globose, 6–7 mm. diam., with membranous partitions between the cells ; seeds glabrous 1. *coccinea*

Leaves deeply pinnatipartite, with narrowly linear segments up to 3 cm. long, glabrous ; flowers usually paired on a common peduncle ; corolla as above but shorter and with a more-lobed limb .. .. .. .. .. .. .. .. 2. *pennata*

1. **Q. coccinea** *Moench.*—F.T.A. 4, 2 : 128 ; Holl. 3 : 474. Annual twiner with brilliant scarlet tubular salver-shaped flowers.
Native of tropical America, widely spread in warm countries as an ornamental plant.
2. **Q. pennata** *Bojer* Hort. Maurit. 224. *Ipomoea quamoclit* Linn. *Convolvulus pennatus* Desr. *Q. vulgaris* Choisy—F.T.A. 4, 2 : 128 ; Stapf 634 ; Holl. 3 : 474. A glabrous twiner, cultivated like the last ; native of tropical America.

## 15. **IPOMOEA** Linn.—F.T.A. 4, 2 : 128.

*Flowers not in involucrate heads :

Leaves bilobed at the apex, suborbicular, up to 12 cm. diam., with numerous nerves radiating from near the base ; petiole up to 8 cm. long ; flowers few in cymes ; calyx 1·5 cm. long ; corolla 5–6 cm. long .. .. .. .. 1. *Pes-caprae*

Leaves not bilobed at the apex :

†Leaves more or less ovate to suborbicular, pandurate or triangular, usually cordate at the base, never lobed :

‡Flowers fairly long-pedunculate, not in a subsessile cluster :

Leaves suborbicular, not acuminate, widely cordate at the base, up to about 12 cm. diam., with few radiating nerves from near the base ; petiole up to 15 cm. long ; flowers cymose ; calyx segments unequal, 1–1·5 cm. long ; corolla 7–8 cm. long ; fruit subglobose, 1·5 cm. diam. ; seeds puberulous 2. *repens*

Leaves not suborbicular, usually acuminate :

Flowers purple-red pink or lilac (not yellow or white) :

Leaves softly tomentose or pubescent below :

Leaves cordate, acuminate, about 9 cm. long and 6 cm. broad, not markedly reticulate below ; flowers umbellate ; calyx lobes about 8 mm. long, rounded at the apex, pilose ; corolla 6 cm. long .. .. .. .. 3. *lilacina*

Leaves broadly cordate-ovate, acuminate, about 10 cm. long and 8 cm. broad, entire, thinly pilose below ; petiole pubescent ; calyx-lobes narrowly lanceolate, long-acuminate, pubescent ; corolla 3 cm. long ; fruit loosely pilose 4. *camporum*

Leaves not cordate, mucronate, 8–12 cm. long, 6–9 cm. broad, woolly on the marked venation below ; flowers solitary, surrounded by 2 large bracts ; calyx 1·5 cm. long ; corolla 8–10 cm. long .. .. 5. *Tessmannii*

Leaves glabrous below or nearly so :

Stems glabrous ; leaves variable, from broadly triangular to lanceolate, more or less hastate at the base, up to 14 cm. long and 8 cm. broad, with numerous lateral nerves ; calyx 1 cm. long ; corolla up to 9 cm. long .. 6. *reptans*

Stems glabrous ; leaves variable, triangular-ovate and entire to deeply trilobed with linear segments, about 7 cm. long with few lateral nerves ; calyx about 6 mm. long ; corolla about 5 cm. long .. .. .. 7. *hellebarda*

Stems setose-pilose ; leaves ovate-triangular, broadly and shortly acuminate, mucronate, widely cordate at the base, up to 14 cm. long and 10 cm. broad ; calyx up to 2·5 cm. long, segments oblong-elliptic ; corolla up to 10 cm. long 8. *setifera*

Flowers yellow or white :

Stems pubescent :

Leaves acuminate :

Leaves ovate with rounded sides, widely cordate at the base, broadly acuminate and mucronate, 6–9 cm. long, 3·5–7 cm. broad, shortly ciliate, pubescent on the nerves below ; flowers cymose ; calyx-segments 7–8 mm. long, mucronate ; corolla 4 cm. long ; fruit broadly ovoid, mucronate, 1·5 cm. long .. .. .. .. .. .. .. 9. *kentrocarpa*

Leaves narrowly triangular with almost straight sides, widely cordate-hastate at the base, mucronate, 7–8 cm. long, 3·5–6 cm. broad, slightly pubescent below ; flowers solitary or paired, very shortly pedicellate ; calyx-segments lanceolate, acuminate, 0·5–1 cm. long, pubescent ; corolla 1 cm. long 10. *Morsonii*

Leaves not acuminate, more or less pandurate, widely cordate at the base, 4–6 cm. long, 3–4 cm. broad, pilose on both surfaces ; flowers few, in axillary fascicles or solitary ; calyx 1 cm. long, pilose ; corolla a little larger than the calyx .. .. .. .. .. .. .. .. 11. *sulphurea*

Stems not pubescent :

Seeds glabrous ; leaves ovate, cordate :

Flowers cymose ; pedicels about 1·5 cm. long ; calyx-segments shortly apiculate .. .. .. .. .. .. .. 12. *micrantha*

Flowers umbellate ; pedicels up to 1 cm. long ; calyx-segments long-apiculate 13. *leucantha*

Seeds pubescent :

Leaves ovate, with rounded sides, openly cordate at the base, 4–6 cm. long, shortly ciliate ; flowers usually paired ; calyx-segments 6 mm. long, mucronate ; corolla 3·5 cm. long ; fruit ovoid, 1 cm. long 14. *ochracea*

Leaves triangular-lanceolate, somewhat hastate at the base, about 4 cm. long, glabrous ; calyx-segments 1 cm. long, mucronate ; corolla 3 cm. long ; fruit 1·5 cm. long ; seeds tomentose .. .. .. .. 15. *fragilis*

‡‡Flowers in a subsessile cluster or subsolitary and subsessile :

Leaves very variable, from ovate-triangular to narrowly lanceolate, widely cordate, mucronate, up to 8 cm. long and 5 cm. broad, pubescent on the nerves below ; flowers clustered ; calyx-segments lanceolate, 7 mm. long, pubescent ; corolla 1 cm. long ; fruit pilose.. .. .. .. .. .. .. 16. *hispida*

Leaves ovate, widely cordate at the base, rounded and mucronate at the apex, 3–5 cm. long, 1·5–3·5 cm. broad, long-petiolate ; flowers solitary or paired, shortly pedicellate ; calyx-segments oblong, 3–4 mm. long, thinly pilose ; corolla 6–8 mm. long ; fruit glabrous, nearly 1 cm. long .. 17. *verticillata*

††Leaves linear or lanceolate, never lobed and not cordate at the base :

Flowers subsessile ; leaves cordate.. .. .. .. .. .. 16. *hispida*

Flowers more or less pedicellate; leaves not cordate:

Calyx pubescent outside:

Calyx about 8 mm. long; corolla slightly longer than the calyx; leaves oblong-lanceolate, pilose below; stems pubescent .. .. .. 18. *coscinosperma*

Calyx 2 cm. long; corolla thrice as long as the calyx; leaves linear or oblong-linear, nearly glabrous; stems puberulous; fruit 1 cm. long 19. *blepharophylla*

Calyx glabrous or warted outside:

Leaves acute at the apex; calyx warted outside; stems usually pilose 20. *Barteri*

Leaves rounded or emarginate at the apex; calyx not warted; stems glabrous 21. *stolonifera*

†††Leaves more or less deeply lobed:

Calyx glabrous outside:

Leaf-lobes entire or nearly so:

Sepals apiculate, 1 cm. long; flowers umbellate or cymose, on a fairly long peduncle; corolla 4–5 cm. long; leaves broadly ovate and widely truncate or cordate at the base or digitately 5-lobed, lobes narrowly triangular, glabrous; petiole up to 15 cm. long .. .. .. .. .. .. 22. *Batatas*

Sepals not apiculate:

Leaves usually 5–7-lobed to about the middle, lobes acuminate; flowers cymose; corolla about 7 cm. long, contracted at the base; fruit 1·5 cm. long; seeds long-villous .. .. .. .. .. .. .. .. 23. *digitata*

Leaves 5-lobed nearly to the base, the outer lobes often lobulate, acutely mucronate; flowers cymose; calyx 6 mm. long; corolla 4·5 cm. long; fruit 1 cm. long; seeds long-pilose .. .. .. .. .. .. 24. *cairica*

Leaves 3-lobed sometimes nearly to the base, lobes linear-lanceolate, about 5 cm. long, glabrous; flowers about 3 in a cyme; calyx 8 mm. long; corolla 6 cm. long, contracted at the base; seeds shortly tomentellous 7. *hellebarda*

Leaf-lobes deeply divided into small segments; flowers subsolitary; calyx warted, 5 mm. long; corolla 1·5 cm. long; fruit 8 mm. long .. .. 25. *dissecta*

Calyx pilose outside:

Leaves thinly pilose below, cordate, trilobed to about the middle, lobes acuminate; petiole with reflexed hairs; calyx-segments 2 cm. long, long-acuminate, densely pilose in the lower half; corolla up to 7 cm. long .. .. 26. *hederacea*

Leaves white-woolly-tomentose below, trilobed to the middle, cordate; calyx as above but shorter; corolla about 2 cm. long .. .. .. .. 27. *pilosa*

**Flowers in involucrate heads:

Leaves digitately and deeply 7–9-lobed, long-pilose below, lobes acutely acuminate; bracts ovate-acuminate, up to 3 cm. long, pilose; calyx about 1 cm. long, pubescent; corolla about 3 cm. long .. .. .. .. .. .. 28. *Pes-tigridis*

Leaves not lobed:

Bracts not united:

Leaves ovate-subcordate, up to 8 cm. long and 6 cm. broad, setose-pilose above, silky below; petiole and branches long-pilose; peduncle up to 5 cm. long; bracts lanceolate; corolla 3 cm. long .. .. .. .. .. 29. *amoena*

Leaves oblong-lanceolate, mucronate, truncate or subcordate at the base, up to 12 cm. long and 4 cm. broad, pilose above, silky below; petiole 1–2 cm. long; bracts as above, long-ciliate; corolla about 5 cm. long .. 30. *argentaurata*

Bracts united into an oval doubly acuminate involucre, up to 5 cm. across; leaves ovate, cordate, mucronate-acuminate, up to 7 cm. long and 5 cm. broad, pilose on both surfaces; corolla 4·5 cm. long .. .. .. .. 31. *involucrata*

1. **Ipomoea Pes-caprae** *Roth* Nov. Pl. Sp. 109. *Convolvulus pes-caprae* Linn. *I. biloba* Forsk.—F.T.A. 4, 2 : 172; Stapf 634; Chev. Bot. 453. Glabrous perennial trailing on sand of the seashore, with half-succulent leaves and large red-purple flowers.

Widely spread in the tropics! Also in S. Africa and African Islands Exsicc.—*Boivin*. *Roger*. *T. Vogel* 23; 44. *Mann* 241.

2. **I. repens** *Lam.*—F.T.A. 4, 2 : 172; Chev. Bot. 456. A glabrous perennial, trailing, with hollow stems and large red-purple flowers.

Both on the coast and in the interior in sandy soil from Mauritania and Senegal throughout the area! Also in Cape Verde Islands, tropical Asia and America. Exsicc.—*Roger*. *Brunner*. *E. Vogel* 49. *Barter* 841. *Rowland*. (See Appendix).

3. **I. lilacina** *Bl.*—F.T.A. 4, 2 : 187. A fairly stout twiner with grey-pubescent striate stems and bright red-purple flowers 1½–2 in. long.

Senegal: on banks of Senegal R.! N. Nigeria: Nupe, banks of the Niger! Benué R., Amar (Dec.)! Yola (May)! Fernando Po (Nov.)! Also in Upper Nile Land, Uganda, E. Africa, St. Thomas Isl., Congo and Angola. Exsicc.—*Roger*. *Leprieur* and *Perrottet*. *T. Vogel* 241. *Barter* 969. *Dalz.* 75.

4. **I. camporum** *A. Chev.* Bot. 454, name only. A twiner with striate pubescent stems and long-pedunculate cymes of pale red-purple flowers.

French Guinea: Farana, Kaba (Jan.)! Exsicc.—*Chev.* 20390.

5. **I. Tessmannii** *Pilger* in Notizbl. Bot. Gart. Berlin 1921 : 542. A stout erect plant, with wrinkled leaves whitish-woolly below, and large reddish-purple flowers 3 in. long.

N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft.! Also in Cameroons. Exsicc.—*Dent Young* 180.

6. **I. reptans** *Poir.* in Lam. Encycl. Suppl. 3 : 460. *Convolvulus reptans* Linn. *I. aquatica* Forsk.—F.T.A. 4, 2 ; 170; Holl. 3 : 474. *I, hellebarda* A. Chev. Bot. 455, not of Schweinf. Nearly glabrous, stems hollow,

from a stout woody stock, trailing on mud and rooting at the nodes, with pale or dark red-purple flowers 2–3 in. long.

French Sudan: Niagaletoumanina! Senegal: Richard Tol, etc. (Sept.)! Sierra Leone: Ronietta (Nov.)! N. Nigeria: common by streams and muddy swamps! S. Nigeria: Lagos Colony! Throughout tropical Africa. Exsicc.—*Roger* 96. *T. Vogel* 126. *Baikie.* *Rowland.* *Elliott* 153. *Dalz.* 188. *Chev.* 636. (See Appendix).

7. **I. hellebarda** *Schweinf.*—F.T.A. 4, 2 : 170. A glabrous twiner or trailer with very variable leaves and flowers 2 in. long, lilac or darker red-purple.

Gambia! Gold Coast: Kumasi (Sept.)! Odumase, Krobo, in open swamps! Exsicc.—*Ingram.* *Dalz.* 133. *Irvine* 1022.

8. **I. setifera** *Poir.*—F.T.A. 4, 2 : 199. A hirsute rather robust twiner and trailer, with red-purple flowers 2 to nearly 4 in. long, the sepals often plicate, tubercled and apiculate.

Senegal and Gambia! Sierra Leone: Kambia (Dec.)! Port Lokko (Dec.)! Yungeru (Jan.)! Gold Coast: Asamankase (Dec.)! Also in tropical America. Exsicc.—*Heudelot* 750. *Brown-Lester* 9. *Sc. Elliot* 5902. *Dalz.* 8050. *Plumptre* 65.

9. **I. kentrocarpa** *Hochst.* —F.T.A. 4, 2 : 163. Slender pubescent twiner with flowers 1–1½ in. long, yellow with purple throat.

French Guinea: Rio Nunez. Sierra Leone: Kambia (Dec.)! Banana Islands. Gold Coast: Anum (Dec.)! Togo: Bismarckburg; Misahöhe. S. Nigeria: Ikirun (Feb.)! Ubuluku (Dec.)! Extends to Eritrea, Abyssinia and E. Africa, and south to Angola. Exsicc.—*Millson.* *Sc. Elliot* 4367. *N. W. Thomas* 2076. *Plumptre* 33.

10. **I. Morsonii** *Baker*—F.T.A. 4, 2 : 140. A slender twiner, sparingly pubescent, with white flowers about ½ in. long.

Sierra Leone: ? locality! Exsicc.—*Morson.*

11. **I. sulphurea** *Hochst.*—F.T.A. 4, 2 : 137. Trailing, woody at the base, pale-pilose, with rather small white (or yellow) flowers with a leafy calyx.

Senegal. Gold Coast. N. Nigeria: Sokoto (Sept.)! Katagum (Aug.)! Also in E. Sudan. Exsicc.—*Dalz.* 180. *Moiser* 81.

12. **I. micrantha** *Hall. f.*—F.T.A. 4, 2 : 166. A nearly glabrous slender twiner with yellowish flowers ½–1 in. long.

Sierra Leone: Kukuna, Scarcies (Jan.)! Gold Coast: Assin Yan Kumasi! Also in Cameroons. Exsicc. —*Sc. Elliot* 4679. *Cummins* 236.

13. **I. leucantha** *Webb*—F.T.A. 4, 2 : 176. A glabrous twiner and trailer with rather angular stems and white flowers ¾–1 in. long.

Senegal! Gambia! Sierra Leone: Kambia (Dec.)! Port Lokko (Dec.)! Magbile (Dec.)! Also in Cape Verde Islands. Exsicc.—*Heudelot* 734. *Hayes* 521. *N. W. Thomas* 5822; 5930; 5932; 5981; 6065; 6180; 6491; 6535. *Deighton* 1082.

14. **I. ochracea** *G. Don*—F.T.A. 4, 2 : 166. A slender twiner, glabrous (often loosely hairy on the young stems) woody at the base, with lemon-yellow flowers with purple centre, 1–1½ in. long.

Gold Coast: Accra and neighbourhood (June–Aug.)! Togo: Lome! N. Nigeria: Kontagora (Dec.)! Bauchi Plateau, Naraguta (Jan.)! S. Nigeria: Oban! Extends to Angola. Exsicc.—*Dalz.* 117; 134 (Gold Coast). *Irvine* 728; 783. *Lely* P. 130. *Talb.* (no number). *Warnecke* 207.

15. **I. fragilis** *Choisy*—F.T.A. 4, 2 : 165. Slender twiner or trailer, nearly glabrous, from a woody base, with pale yellow or whitish flowers ¾–1 in. long.

Sierra Leone: Kamala (Mar)! Yungeru (Jan.)! Gold Coast: Kintampo (Mar.)! Bauchi Plateau, Jos (Mar.)! Naraguta (Jan.)! Extends to E. Sudan and Abyssinia, and to Angola. Exsicc.—*Dalz.* 32. *Hill* 16. *Lely* 7; P. 73. *N. W. Thomas* 305; 7305.

16. **I. hispida** *Roem. & Schult.* Syst. 4 : 238. *Convolvulus hispidus* Vahl. *I. eriocarpa* R.Br.—F.T.A. 4, 2 : 136; Chev. Bot. 454. Stems slender, pubescent, slightly woody below, prostrate or twining, with small white or lilac flowers with red-purple centre, ⅓ in. long.

Common especially in open country! Throughout tropical Africa, and in Madagascar, tropical Asia and N. Australia. Exsicc.—*Roger* 116. *Barter* 1027. *Ingram.* *Hart.* *Sc. Elliot* 5186. *Millen* 139; 167. *Pobéguin* 584. *Warnecke* 253. (See Appendix).

17. **I. verticillata** *Forsk.*—F.T.A. 4, 2 : 136. A prostrate annual with small white axillary flowers.

Senegal! Also in E. Sudan, Abyssinia and Angola. Exsicc.—*Perrottet.* *Leprieur.*

18. **I. coscinosperma** *Hochst.*—F.T.A. 4, 2 : 138. Trailing herb with loosely hairy slender stems, and small purplish or red flowers ⅓ in. long.

French Sudan: Sompi (Aug.)! San (Sept.)! Sébi (Aug.)! N. Nigeria: Sokoto (Sept.)! Extends to E. Sudan and Abyssinia. Exsicc.—*Dalz.* 374. *Chev.* 2890; 2896; 2897; 2898; 2899; 2900.

19. **I. blepharophylla** *Hall. f.*—F.T.A. 4, 2 : 141; Chev. Bot. 454. Stems slender, pubescent, trailing from a woody rootstock, with narrow funnel-shaped flowers 2–2½ in. long, pale- or red-purple with darker lines and throat.

French Sudan: Sarankoro (Feb.)! Gold Coast: Afram Plains (Mar.)! N. Nigeria: Abinsi (May, July)! Yola, Bornu Road (July)! Bauchi Plateau, Mongu, 4,300 ft. (July)! Naraguta (June)! Exsicc.—*Johnson* 728. *Dalz.* 69; 683. *Lely* 311; 392.

20. **I. Barteri** *Baker*—F.T.A. 4, 2 : 169; Chev. Bot. 453. Stems twining, very slender, pilose at first becoming glabrous, with flower 2–2½ in. long and as much across the limb, pale, almost white, or reddish-purple with darker throat and tube.

French Sudan: from Niodougou to Sumpi (Oct.). Senegal: Tamboukané (Dec.). Sierra Leone Binkolo (Aug.)! Banana Islands. N. Nigeria: Jebba! Yola, Bornu Road (July)! Bauchi Plateau, Mongu, 4,300 ft. (July)! Vom! Exsicc.—*Barter* (no number). *Dalz.* 70. *Lely* 391. *Dent Young* 178. *N. W. Thomas* 1770.

21. **I. stolonifera** *Gmel.*—F.T.A. 4, 2 : 171; Chev. Bot. 456. Stems slender, glabrous, from a perennial tuberous root, creeping and sending up short leafy branchlets; flowers pure white with a purple centre, 2 in. across the open limb.

Common on seashore! Widely spread on the shores of warm countries. Exsicc.—*T. Vogel* 35. *Barter* 23; 1843. *Morson.* *Sc. Elliot* 4109. *Dalz.* 1159. *Warnecke* 56.

22. **I. Batatas** *Poir.*—F.T.A. 4, 2 : 175; Stapf 634; Holl. 3, 475; Chev. Bot. 453. Trailing and climbing, nearly glabrous, from a tuberous root; flowers campanulate-funnel-shaped with whitish or pink-tinged limb and red-purple centre 1½–2 in. long.

The "Sweet Potato," commonly cultivated and naturalised near habitations or railways, etc.! (See Appendix).

23. **I. digitata** *Linn.*—F.T.A. 4, 2 : 189. Holl. 3 : 479; Chev. Bot. 454 (incl. var. *djalonis* and *eriosperma* A. Chev.). *I. ennealoba* P. Beauv. Fl. Owar. 2 : 69, t. 101. Perennial with a large tuberous root, with widely climbing glabrous hollow stems, and conspicuous rose-red flowers 2–2½ in. long in pedunculate cymes.

Gambia and French Guinea to N. and S. Nigeria, and in Cameroons and Fernando Po! Cosmopolitan in the tropics. Exsicc.—*T. Vogel* 31; 53; 80; 96. *Barter* 1267. *Mann* 422. *Sc. Elliot* 4507 (partly). *Whyte.* *Dalz.* 71; 682; 1074. *Chipp* 473. *G. P. Cooper* 15. *Chev.* 14944; 14945. (See Appendix .

24. **I. cairica** *Sweet* Hort. Brit. 287. *Convolvulus cairicus* Linn. *I. palmata* Forsk.—F.T.A. 4, 2 : 178; Stapf 634; Holl. 3 : 480; Chev. Bot. 455. *I. vesiculosa* P. Beauv. Fl. Owar. 2 : 73, t. 106. A slender twiner, with glabrous, sometimes warted stems, and funnel-shaped flowers pale or reddish-purple 1½–2 in. long.

Senegal: Dakar, Casamance, etc.! Gambia! Sierra Leone: various localities! Liberia: Monrovia! Ivory Coast: Bingerville and environs! Makougnié! Bériby! Gold Coast: Cape Coast. N. Nigeria:

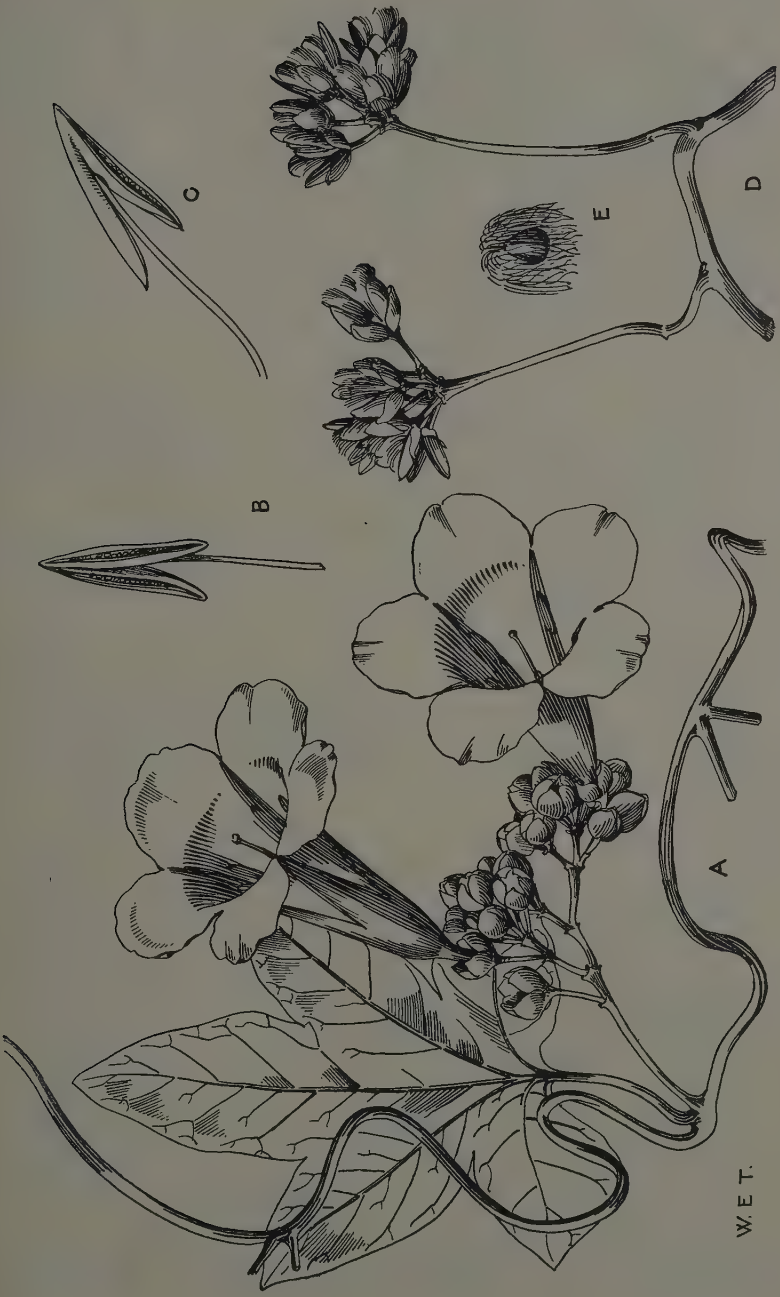

FIG. 251.—IPOMOEA DIGITATA *Linn.* (CONVOLVULACEAE).
A, flowering shoot. B and C, stamen. D, fruits. E, seed.

Bornu, 50 miles from Maifoni ! S. Nigeria : Lagos, road to Victoria Beach (Apr.) ! Fernando Po (Oct. Dec.) ! Throughout tropical Africa ; also Egypt, S. Africa, and widely spread in the tropics. Exsicc.—*Brunner*. *Roger*. *Leprieur*. *T. Vogel* 40 ; 48 ; 236. *Mann* 54. *Ingram*. *Sc. Elliot* 4082. *Whyte*. *Farmar* 158. *Parsons* (no number). *Dalz*. 1071. *Chev*. 17330.

25. **I. dissecta** *Willd.*—F.T.A. 4, 2 : 176 ; Chev. Bot. 454. A slender glabrous trailing herb with much-divided leaves and small white flowers $\frac{1}{2}$–$\frac{2}{3}$ in. long.

French Sudan : Timbuktu, in dunes (July) ! Fereibo ; Goundam (Oct.) ! Senegal ! Gold Coast : Accra and environs (July) ! Cape Coast. Togo : Lome ! N. Nigeria : Katagum (Sept.) ! Bornu ! Benue R. ! S. Nigeria : Lagos ! Throughout tropical Africa ; also in S. Africa, Asia and Australia. Exsicc.—*Heudelot* 270. *Roger*. *Leprieur*. *Brown* 305. *Dawodu* 85. *Dalz*. 178. (See Appendix).

26. **I. hederacea** *Jacq.* Collect. 1 : 124 ; Ic. t. 36.—F.T.A. 4, 2 : 159 ; Holl. 3 : 480. A twiner, the stems, etc., covered when young with spreading yellow hairs ; the flowers pale blue in the morning turning bright pink or red-purple, with long narrow calyx-lobes ; on fences in villages and in fields.

Gold Coast : Cape Coast. N. Nigeria : Lokoja and environs, Mt. Patti (Oct.) ! Jebba ! Sokoto (Oct.–Dec.) ! Damre (Oct.) ! Waimako (Oct.) ! Kadaura (Sept.) ! Bornu ! Benue R. ! S. Nigeria : Ilaro ! Widely spread in the tropics. Exsicc.—*T. Vogel* 125. *Barter* (no number). *Dalz*. 76 ; 376. *Lely* 592. *Punch* 39. *Dawodu* 29.

27. **I. pilosa** *Sweet*—F.T.A. 4, 2 : 161 ; Chev. Bot. 456. A perennial twiner, coarsely hairy, with leaves white below and rather small pink or red-purple flowers $\frac{3}{4}$ in. long in pedunculate axillary cymes.

French Sudan : Koulikoro (Oct.). Senegal : Richard Tol (Jan.) ! Gambia ! Ivory Coast : Makougnié (Jan.) ! Soubré (June). N. Nigeria : Sokoto (Nov.) ! Katagum ! Bauchi Plateau, Nabardo (Sept.) ! Bornu ! Benue R. ! Throughout tropical Africa. Exsicc.—*Roger*. *Ingram*. *Dalz*. 185. *Lely* 611. *Moiser*. *Gosling*. *Talb*. 808.

28. **I. Pes-tigridis** *Linn.*—F.T.A. 4, 2 : 158. Coarsely-hairy twiner with deeply divided leaves, and pink or red-purple flowers 1 in. or more long in pedunculate bracteate heads.

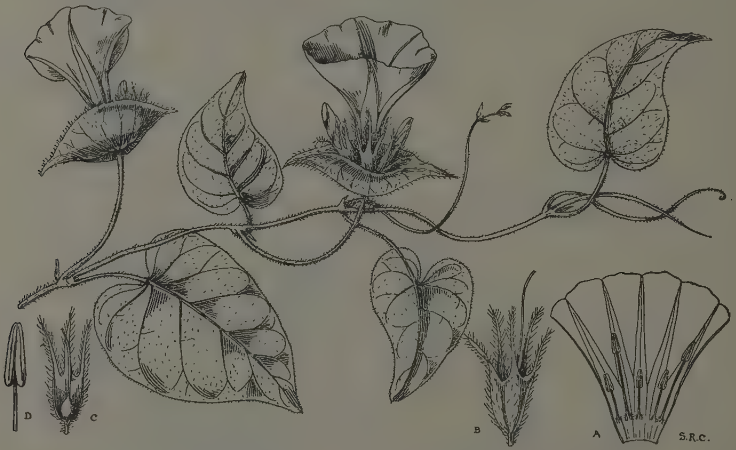

FIG. 252.—IPOMOEA INVOLUCRATA *P. Beauv.* (CONVOLVULACEAE).

A, corolla laid open. B, calyx and style. C, the same with the calyx cut open. D, anther.

N. Nigeria : Sokoto (Sept., Nov.) ! Ako (Oct.) ! Katagum (Oct.) ! Extends to E. Sudan, Somaliland and S.E. Tropical Africa ; also in Mauritius and Asia. Exsicc.—*Dalz*. 186. *Lely* 652. *Moiser*.

29. **I. amoena** *Choisy*—F.T.A. 4, 2 : 154 ; Chev. Bot. 453. A twiner, densely yellow-hairy, with leaves silvery-silky below, and flowers either red-purple or white with a purple centre $\frac{3}{4}$–1 in. long in peduncled bracteate heads.

French Sudan : Koulikoro (Oct.). Senegal ! Gambia ! Gold Coast : Ashanti, Dukweisin (Dec.) ! Cape Coast. Achimota (Nov.) ! N. Nigeria : Lokoja ! Toro (Oct.) ! Panshanu (Sept.) ! S. Nigeria : Lagos Colony ! Extends to E. Sudan ? and south to Angola. Exsicc.—*Heudelot* 146. *Barter* (no number). *Ingram*. *Rowland*. *Chipp* 608. *Lely* 608 ; 686. *Irvine* 819. *Brooks* 29.

30. **I. argentaurata** *Hall. f.*—F.T.A. 4, 2 : 153. Stems prostrate or ascending from a woody base, whitish-tomentose and with spreading yellow hairs ; flowers whitish turning light purplish with darker centre, 2 in. long and as much across the limb.

Sierra Leone : Sumbaraya (Feb.) ! Togo : between Misahöhe and Bismarckburg. N. Nigeria : common in grass savannah, by roadsides, etc. ! S. Nigeria : Lagos Colony ! Ibadan ! Extends to Ubangi-Shari. Exsicc.—*T. Vogel* 123. *Barter* 1031. *Sc. Elliot* 4949. *Rowland*. *Elliott* 16. *Dalz*. 118 ; 684. *Shaw* 80. *Lely* 566. *Dent Young* 177. *Foster* 141. (See Appendix).

31. **I. involucrata** *P. Beauv.* Fl. Owar. 2 : 52, t. 89—F.T.A. 4, 2 : 150 ; Stapf 634; Holl. 3 : 480; Chev. Bot. 455. Twiner, often widely climbing, pubescent, with red-purple flowers $1\frac{1}{2}$ in. long or more opening one at a time in the head enclosed in a boat-shaped involucre.

Very common ! Throughout tropical Africa. Exsicc.—*Perrottet*. *Don*. *T. Vogel* 43 ; 234. *Barter* 1748 ; 2185. *Irving*. *Ingram*. *Sc. Elliot* 3845. *Brown-Lester* 24. *Cummins*. *Johnson* 239. *Dawodu* 18. *Whyte*. *Dalz*. 120 ; 1075. *Dunlap* 6. *G. P. Cooper* 11. (See Appendix).

### 16. STICTOCARDIA Hall. f. in Engl. Bot. Jahrb. 18 : 159 (1893).

Branches puberulous ; leaves long-petiolate, very widely ovate-orbicular, widely cordate at the base, broadly acuminate, about 15 cm. diam., with numerous nerves from near the base, puberulous below, with large glandular areas here and there which perish and leave large holes ; cymes subsessile or shortly pedunculate, few-flowered ; calyx-segments 1·3 cm. long, stellate-pubescent towards the base ; corolla about 4·5 cm. long, widely tubular .. .. .. .. .. .. .. .. *beraviensis*

**S. beraviensis** *Hall. f.* l.c. *Argyreia* (?) *beraviensis* Baker—F.T.A. 4, 2 : 201 ; Chev. Bot. 453. A stout climber with finely pubescent pithy stems, and crimson or red-purple flowers 1½–2 in. long.

French Guinea : Kouria, banks of the Konkouré (Nov.) ! Farana, at Kaba (Jan.) ! Gold Coast : Akwapim (Dec.) ! Liberia : Kakatown ! N. Nigeria : Kabba, Bangeddi (Oct.) ! S. Nigeria : Lagos Colony ! Idumuye (Dec.) ! Onitsha (Oct.) ! Oban ! Also in E. Africa and Madagascar. Exsicc.—*Millen* 55. *Johnson* 759. *Whyte*. *Parsons* 77. *Foster* 366. *N. W. Thomas* 1904 ; 2122. *Talb.* 801. *Chev.* 14874 ; 20389.

### 17. CUSCUTA Linn.—F.T.A. 4, 2 : 202.

Stems slender ; flower-clusters dense, about 1 cm. diam. ; flowers shortly pedicellate ; bracts ovate, about 2 mm. long ; calyx-lobes 5, ovate, obtuse ; corolla 3 mm. long subglobose, lobes reflexed ; scales fimbriate ; styles free to the base, stigmas capitate .. .. .. .. .. .. .. .. .. .. *chinensis*

**C. chinensis** *Lam.*—F.T.A. 4, 2 : 204. Leafless parasitic twiner with very slender tangled stems bright yellow or reddish-orange in colour, and small white flowers.

Sierra Leone : Panguma ! Gold Coast : Aburi (July) ! S. Nigeria : Lagos, common in native gardens (July, Dec.) ! Also tropical Asia to Australia. Exsicc.—*Johnson* 157. *Smythe* 88. *Dalz.* 1152 ; 1353.

## 137. SCROPHULARIACEAE

Herbs or shrubs, rarely small trees. Leaves alternate, opposite or verticillate ; stipules absent. Flowers hermaphrodite, mostly zygomorphic. Calyx imbricate or valvate. Corolla-lobes imbricate. Stamens often 4 or 2, rarely 5, inserted on the corolla and alternate with the lobes, sometimes the fifth stamen represented by a staminode ; filaments free from each other ; anthers 1–2-celled, opening lengthwise. Ovary superior, entire, usually 2-celled ; style terminal. Ovules numerous on axile placentas. Fruit a capsule or berry. Seeds numerous, with fleshy endosperm.

Widely distributed. Recognised by the usually opposite exstipulate leaves, mostly zygomorphic flowers, entire ovary with terminal style, and axile placentas.

Leaves alternate, never all radical :
 Stamens 4 or 5 :
  Leaves not orbicular ; erect herbs :
   Filaments bearded ; flowers in long racemes .. .. .. .. 1. **Celsia**
   Filaments not bearded ; flowers single or paired .. .. .. .. 2. **Capraria**
  Leaves orbicular ; creeping herbs with small axillary flowers .. 3. **Sibthorpia**
 Stamens 2 .. .. .. .. .. .. .. .. .. 4. **Anticharis**
Leaves opposite or all radical (sometimes the upper leaves alternate) :
 Perfect stamens 4 or 5 (very rarely 3) :
  Leaves all radical ; anthers 1-celled .. .. .. .. .. 5. **Limosella**
  Leaves not all radical :
   Stamens all inserted in the corolla-tube :
    Adaxial corolla-lobe outside in bud :
     Terrestrial plants :
      Anther-cells distinct and separate .. .. .. .. 6. **Stemodia**
      Anther-cells distinct but contiguous .. .. .. .. .. 7. **Bacopa**
     Aquatic or bog plants .. .. .. .. .. .. 8. **Limnophila**
    Adaxial corolla-lobe or lobes inside in bud :
     Anthers with 2 fertile equal or nearly equal cells :
      Not parasitic :
       Corolla-lobes 5 .. .. .. .. .. .. .. 9. **Micrargeria**
       Corolla-lobes 4 .. .. .. .. .. .. .. 10. **Scoparia**
      Parasitic ; corolla-lobes 5 :
       Calyx 5-lobed and 10-ribbed .. .. .. .. .. .. 11. **Alectra**
       Calyx 4-lobed .. .. .. .. .. .. .. .. 12. **Bartsia**
     Anthers 1-celled or with 1 fertile cell and 1 variously modified sterile cell or appendage :
      Anthers (at least two of them) 2-celled, with 1 fertile cell and 1 sterile cell or appendage .. .. .. .. .. .. .. .. 13. **Sopubia**
      Anthers all 1-celled :
       Corolla-tube straight or nearly so ; calyx tubular :
        Capsule straight, oblong or ellipsoid :
         Capsule dry and dehiscent ; corolla rather small, lobes subequal 14. **Buchnera**
         Capsule fleshy and indehiscent ; corolla large, upper lobes united, smaller than the lower .. .. .. .. .. .. .. 15. **Cycnium**
        Capsule obliquely ovoid, long-beaked ; calyx campanulate 16. **Rhamphicarpa**

Corolla-tube mostly sharply curved at or above the middle; flowers rather small .. .. .. .. .. .. .. .. .. 17. **Striga**
Stamens all (or some of them) inserted at the throat of the corolla:
Flowers large; calyx 5-partite, segments broad and imbricate 18. **Artanema**
Flowers small:
Calyx deeply 5-partite:
Calyx-segments linear; corolla cylindric .. .. .. 19 **Lindernia**
Calyx-segments oblong or elliptic; corolla subcampanulate; leaves glandular 20. **Hydranthelium**
Calyx 5-toothed; lower stamens dilated and sharply bent at the base 21. **Craterostigma**
Calyx 2-lipped; lower stamens not sharply bent, but with an appendage 22. **Torenia**
Perfect stamens 2:
Adaxial lobe of the corolla outside in bud:
Calyx-lobes imbricate; capsule loculicidal, globose or ovoid .. 23. **Dopatrium**
Calyx-lobes narrow, scarcely imbricate; capsule septicidal, oblong to linear 24. **Ilysanthes**

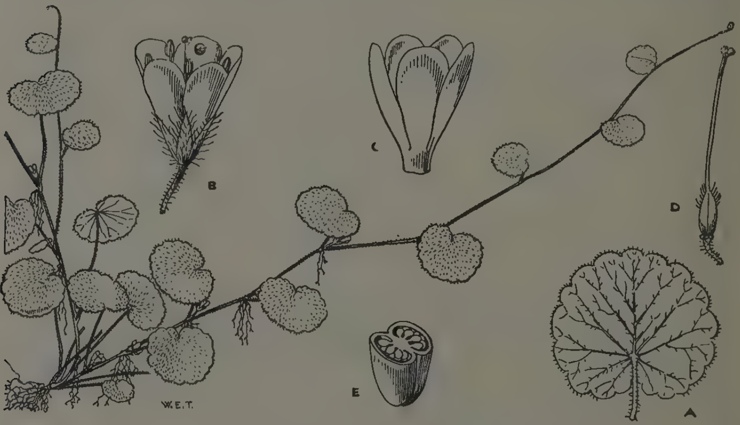

FIG. 253.—SIBTHORPIA AUSTRALIS *Hutch.* (SCROPHULARIACEAE).
A, leaf, from below. B, flower. C, corolla. D, pistil. E, cross-section of fruit.

Calyx-segments oblong or elliptic, not imbricate; capsule globose-ellipsoid 20. **Hydranthelium**
Adaxial lobe of the corolla inside in bud; capsule compressed, obovate or obcordate 25. **Veronica**

### 1. **CELSIA** Linn.—F.T.A. 4, 2 : 280.

Stems densely leafy, pubescent; leaves alternate, lanceolate, closely serrulate, up to 6 cm. long, tomentose below; racemes up to 60 cm. long (in fruit); bracts ovate-lanceolate, nearly as long as the pedicels; pedicels up to 1·5 cm. long, glandular; calyx-segments ovate-lanceolate, acuminate, glandular; corolla rotate, subregular; stamens 4; fruit ellipsoid, 1 cm. long .. .. .. .. .. *densifolia*

**C. densifolia** *Hook. f.*—F.T.A. 4, 2 : 284. Erect robust pithy stems, slightly branched at the base, 3 ft. high with yellow flowers $\frac{1}{2}$–$\frac{2}{3}$ in. in diameter in a long raceme.

Cameroons Mt., grassland, 8,000–9,000 ft. (Dec.)! Fernando Po, 8,500 ft.! Exsicc.—*Munn* 1453. *Johnston* 9. *Mildbread* 10859.

### 2. **CAPRARIA** Linn.—F.T.A. 4, 2 : 355.

A small shrub; branches thinly pilose; leaves broadly oblanceolate, long-cuneate and entire towards the base, sharply serrate in the upper half, 3–3·5 cm. long, 1–1·5 cm. broad, slightly pubescent towards the margin; flowers 1–2, axillary; pedicels nearly 1 cm. long; calyx-segments linear-lanceolate, about 4 mm. long, ciliate; corolla widely funnel-shaped, 1 cm. long; fruit broadly ellipsoid, 5 mm. long, gland-dotted *biflora*

**C. biflora** *Linn.*—F.T.A. 4, 2 : 355. Erect branched woody undershrub, 2 or more ft. high, with bright white flowers $\frac{1}{3}$ in. long.

Gold Coast : Cape Coast (July) ! Anamabu Castle ! Accra (Oct.) ! Native of tropical America, naturalised near the coast in Gold Coast ; also in Cape Verde Islands and Mauritius. Exsicc.—*T. Vogel* 79. *Brown* 377. *Dalz.* 115.

### 3. **SIBTHORPIA** Linn.—F.T.A. 4, 2 : 353.

A weak straggly herb rooting at the nodes ; stems thinly pubescent ; leaves reniform-orbicular, crenate with numerous small teeth, 1·5–2 cm. diam., pilose on both surfaces ; petiole slender, pubescent ; pedicels 3–4 mm. long ; calyx about 2 mm. long, pubescent, shortly lobed ; corolla purple .. .. .. .. .. *australis*

**S. australis** *Hutch.* in Kew Bull. 1931 : ined. *S. europæa* var. *africana* Hook. f.—F.T.A. 4, 2 : 354, partly.
Cameroons Mt., 7,000 ft. (Dec.) ! Fernando Po, 7,500 ft. ! Also on Kilimanjaro at 7,000 ft. Exsicc.—*Mann* 1455 ; 1963. *Mildbr.* 7096.

### 4. **ANTICHARIS** Endl.—F.T.A. 4, 2 : 275.

A glandular herb ; leaves linear, acute, up to 5·5 cm. long and 4 mm. broad, glandular-pubescent ; flowers axillary, solitary ; pedicels slender, up to 1·5 cm. long, with a pair of linear bracts above the middle ; calyx-segments linear, 6 mm. long ; corolla 1 cm. long, subregular ; stamens 2 ; anthers free ; fruit ovoid, beaked, about 8 mm. long, shortly pubescent .. .. .. .. .. .. .. *linearis*

**A. linearis** *Hochst.*—F.T.A. 4, 2 : 276 ; Chev. Bot. 469. Erect much-branched glandular-pubescent herb, woody below, up to 1 ft. or more high, with pink or purplish flowers ⅓–½ in. long.
French Sudan : Goundam (Aug.) ! Gourma, from Fada to Koupéla (July) ! Senegal ! N. Nigeria : Sokoto (Nov.) ! Bornu, Kuka (Jan.) ! From Cape Verde Islands to India. Exsicc.—*Leprieur*. *Perrottet*. *E. Vogel* 11. *Moiser* 231.

### 5. **LIMOSELLA** Linn.—F.T.A. 4, 2 : 352.

Leaves spathulate, glabrous, long-petiolate, 3-nerved from the base, all radical ; flowers axillary, solitary, shortly pedicellate ; calyx 3 mm. long, glabrous ; corolla a little longer than the calyx ; fruit subglobose, about 3 mm. diam. .. .. 1. *aquatica*
Leaves acicular, terete or subterete ; flowers, etc., as above .. 2. *tenuifolia*

1. **L. aquatica** *Linn.*—F.T.A. 4, 2 : 352. A small tufted aquatic or marsh herb, often with stolons bearing tufts of leaves and rooting ; flowers small, lilac or pinkish.
Cameroons Mt., 9,800–10,800 ft. ! Also in Abyssinia, and cosmopolitan. Exsicc.—*Mann*.
2. **L. tenuifolia** *Wolf.* ex *Hoffm.* Deutsch. Fl. ed. 2, 1, 2 : 29. *L. aquatica* var. *tenuifolia* Hook. f.—F.T.A. 4, 2 : 352. Stolons usually absent.
Fernando Po, summit of Clarence Peak (Dec.) ! Cosmopolitan. Exsicc.—*Mann* 597.

### 6. **STEMODIA** Linn.—F.T.A. 4, 2 : 313.

Leaves lanceolate, sessile, broad at the base, up to 5 cm. long, dentate towards the apex. pubescent on the nerves ; flowers in leafly spike-like racemes ; calyx-segments linear, about 6 mm. long, pubescent ; corolla 2-lipped ; stamens 4, included ; fruit narrow, glabrous, as long as the calyx .. .. .. .. .. 1. *serrata*
Leaves more or less ovate, serrate except the cuneate base, petiolate about 1·5 cm. long ; flowers axillary, subsolitary ; fruit globose.. .. .. .. 2. *parviflora*

1. **S. serrata** *Benth.*—F.T.A. 4, 2 : 314. An erect, much branched viscid glandular-pubescent herb 6–12 in. high, with small yellow flowers about ¼ in. long.
Senegal ! Exsicc.—*Leprieur.*
2. **S. parviflora** *Ait.* Hort. Kew ed. 2, 4 : 52. *S. senegalensis* Desf. ? Small, much-branched herb, almost woody below, erect, or decumbent, a few inches high, with blue-purple flowers.
Sierra Leone : S. Prov., Nyiyama, in moist sand at edge of river (Apr.) ! Native of tropical America, probably introduced ; also in Mauritius. Exsicc.—*Deighton* 1659.

### 7. **BACOPA** Aubl. Pl. Guian. 1 : 128, t. 49 (1775). (*Moniera* B. Juss.—F.T.A. 4, 2 : 319).

Flowers fairly long-pedicellate :
 Pedicels pubescent :
  Leaves broadly rounded at the base, lanceolate, 1–2 cm. long, minutely glandular below, slightly scabrid on the upper surface ; larger calyx-segment ovate-orbicular, about 8 mm. long in fruit .. .. .. .. .. .. .. 1. *pubescens*
  Leaves narrowly lanceolate, acute, narrowed to the base, 2·5–4 cm. long, scabrid above and on the midrib below ; larger calyx-segment ovate-acuminate 2. *floribunda*
 Pedicels glabrous :
  Erect or ascending plants :
   Larger calyx-segment oblong-elliptic, about twice as long as broad, about 1 cm. long, entire or toothed, glandular ; leaves oblanceolate, toothed in the upper half, 3–7 cm. long, glabrous but gland-dotted below .. .. .. 3. *erecta*
   Larger calyx-segment broadly ovate-orbicular, nearly as broad as long, about 8 mm. long, venose, entire ; leaves oblanceolate, toothed in the upper part, densely gland-dotted below .. .. .. .. .. .. .. 4. *calycina*
  Decumbent, often rooting at the nodes ; leaves oblanceolate, rounded at the apex, glabrous, up to 2 cm. long ; pedicels 1–2 cm. long ; calyx-segments ovate, broadly and obtusely acuminate .. .. .. .. .. .. 5. *Monnieria*

Flowers sessile or very shortly pedicellate :
Leaves narrowed to the base, narrowly lanceolate, about 3 cm. long, obscurely glandular below ; adaxial calyx-segment broadly ovate, gland-dotted, venose ; fruit glabrous .. .. .. .. .. .. .. .. 6. *Hamiltoniana*
Leaves broad at the base, ovate-lanceolate, 1·5–2 cm. long, densely gland-dotted below ; adaxial calyx-segment ovate, subcordate at the base, markedly glandular 7. *occultans*

1. **Bacopa pubescens** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Moniera pubescens* Skan—F.T.A. 4, 2 : 322. Herb a few inches high, slightly branched, glandular-punctate, with small white flowers.
Sierra Leone : marshy ground by Falaba River (Apr.) ! Exsicc.—*Sc. Elliot* 5451.

2. **B. floribunda** *Wettst.* in Engl. & Prantl. Pflanzenfam .4, 3B : 77. *Moniera floribunda* T. Cooke. *M. bicolor* A. Chev. Bot. 470. Erect branched herb up to about 1 ft. high, usually less, glandular-punctate, slightly pubescent, with small bluish-purple flowers with yellow throat ; in damp places, rice-fields, etc.
Senegal ! Gambia ! Ivory Coast : Baoulé-Sud, Toumodi (Aug.) ! N. Nigeria : Borgu ! Nupe ! Lokoja (Oct.) ! Kontagora (Nov.) ! Extends to E. Sudan and E. Africa ; also Madagascar, tropical Asia and Australia. Exsicc.—*Perrottet.* *Barter* 785 ; 1011. *Dalz.* 159. *Parsons* 60 ; 101. *Dawe* 28. *Chev.* 22410.

3. **B. erecta** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *B. decumbens* F. N. Williams. *Moniera decumbens* Skan—F.T.A. 4, 2 : 321 ; not *Herpestis decumbens* Fernald. Erect herb with spongy stems up to 2 ft. high, with small white flowers often crowded in the axils or at the ends of short branches ; in swamps, etc.
Senegal ! Gambia : Sukuko, etc. (Jan.) ! Sierra Leone : Mahela, in rice-fields (Dec.) ! Urika (Mar.) ! Rokupra (Jan.) ! Mano Salija (Nov.) ! Exsicc.—*Heudelot* 595. *Brown-Lester* 30. *Sc. Elliot* 3847. *Dalz.* 8060. *Dawe* 66. *Deighton* 433 ; 959. *Glanville* 187.

4. **B. calycina** *Engl.* in Schlechter Westafrik. Kautsch.-Exped. 313. *Moniera calycina* Hiern—F.T.A. 4, 2 : 320 ; Chev. Bot. 471. A nearly glabrous herb, erect amongst grass, etc., a few inches up to 3 ft. high, or rooting at the lower nodes and ascending, half-succulent, spongy below, with small white solitary axillary flowers ; in swamps and ditches, etc.
Senegal ! Gold Coast : Accra Plains (July) ! Togo : Lome ! N. Nigeria : Borgu ! Sokoto (Jan.) ! Lokoja (Nov.) ! Yola (Jan.) ! S. Nigeria : Lagos, Ikoyi (Oct.) ! Extends to Angola, Upper Belgian Congo and Zanzibar. Exsicc.—*Perrottet.* *Leprieur* 214. *Barter* 1690. *Dalz.* 123 ; 124 ; 358 ; 1238. *Irvine* 725. *Warnecke* 226.

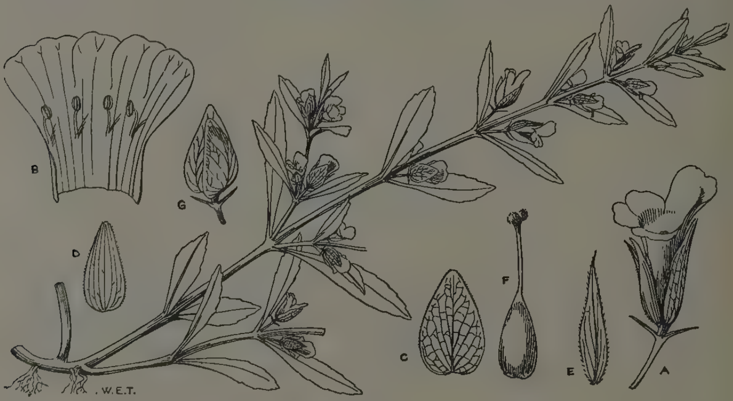

FIG. 254.—BACOPA CALYCINA *Engl.* (SCROPHULARIACEAE).

A, flower. B, corolla laid open. C, one sepal. D, another sepal. E, a third sepal. F, pistil. G, calyx enveloping the fruit.

5. **B. Monnieria** *Wettst.* in Engl. & Prantl. Pflanzenfam. 4, 3B : 77. *Gratiola Monnieria* Linn. *Moniera cuneifolia* Michaux—F.T.A. 4, 2 : 320. A creeping herb, with small blue flowers ¼ in. long, solitary, axillary.
S. Nigeria : Lagos Colony, Koto. Also in Mozambique, and found in almost all warm countries. Exsicc. —*Beauvois* (not seen).

6. **B. Hamiltoniana** *Wettst.* in Engl. & Prantl, Pflanzenfam 4 3B : 77. *B. alternifolia* Engl. *Moniera hamiltoniana* T. Cooke. *M. scabrida* A. Chev. Bot. 471. Erect, usually branched, nearly glabrous herb, 6–12 in. high, with small bluish solitary axillary flowers ; in damp places.
Senegal ! Ivory Coast : Baoulé Sud, Toumodi (Aug.) ! N. Nigeria : Kontagora (Nov.) ! Also in India. Exsicc.—*Leprieur* 237. *Dalz.* 158. *Chev.* 22391.

7. **B. occultans** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Moniera occultans* Hiern. Erect, branched from the base, slightly pubescent, half-succulent or spongy below, a few inches high, with small white flowers solitary or few in the axils.
N. Nigeria : Nupe, partly submerged by margin of pools ! Also in Angola. Exsicc.—*Barter* 1689.

## 8. **LIMNOPHILA** R.Br.—F.T.A. 4, 2 : 316.

Flowers long-pedicellate, axillary or subterminal, pedicels up to 2 cm. long, slender ; leaves deeply divided, the lower in whorls, the upper whorled or opposite, sometimes only dentate ; calyx-segments linear, 5 mm. long ; corolla 1 cm. long ; fruit 5 mm. long .. .. .. .. .. .. .. .. .. 1. *gratioloides*
Flowers sessile or subsessile :
Flowers in interrupted spikes ; leaves much divided (in water) or ovate and denti-

culate, 3-nerved from the base, 1·5–2 cm. long, punctate on the upper surface, pubescent below; flowers very small .. .. .. .. .. 2. *Barteri*

Flowers in a terminal cluster-like spike; submerged leaves much-divided, the aerial ones oblong-linear, obtuse, denticulate, punctate; calyx-segments ovate-lanceolate, keeled, 3·5 mm. long; corolla 1·5 cm. long .. .. .. 3. *dasyantha*

1. **L. gratioloides** *R.Br.*—F.T.A. 4, 2 : 319. *Ambulia gratioloides* Baill.—Chev. Bot. 470. Slender, glabrous or slightly glandular-pubescent herb, branched or simple, a few inches to 2 ft. long, in mud or submerged sometimes in masses, with white flowers.
French Sudan: Nafadié (Jan.)! Senegal: in inundated places (Jan.)! Togo: Lome! Tropical Africa, Asia, Malaya and Australia. Exsicc.—*Roger* 59. *Chev.* 155. *Warnecke* 230.

var. **nana** *Skan*—F.T.A. 4, 2 : 319. Very dwarf, about 5 cm. long; flowers subterminal.
N. Nigeria: Jebba, sandy margin of a lake! Exsicc.—*Barter* 1709.

2. **L. Barteri** *Skan*—F.T.A. 4, 2 : 317; Chev. Bot. 470. Aquatic herb or in inundated mud; main stems erect, branched (often from the base) pubescent and gland-dotted; submerged stems decumbent with dissected leaves; flowers minute, white.
Sierra Leone: Lomaburn (Feb.)! Ivory Coast: Baoulé-Nord, Nzi Valley, between Alangouassou and Mbayakro (Aug.). N. Nigeria: Nupe! Kontagora (Nov.)! Exsicc.—*Barter* 751. *Sc. Elliot* 5032. *Dalz.* 161.

3. **L. dasyantha** *Skan*—F.T.A. 4, 2 : 318; Chev. Bot. 470. An aquatic herb, 2–3 ft. long when submerged, the lower part of stem leafless, with conspicuous yellow flowers ⅔ in. long.
Sierra Leone: Bentembu (Apr.)! Songo (Oct.)! Mamake (Nov.)! Malema (Nov.)! N. Prov., Materboi (Oct.)! Also in Angola. Exsicc.—*Sc. Elliot* 5862. *Lane-Poole* 379. *N. W. Thomas* 4334. *Deighton* 434. *Glanville* 25.

### 9. MICRARGERIA Benth.—F.T.A. 4, 2 : 457.

Plants scabrid all over; leaves linear-acicular, acute, 1·5–2·5 cm. long; flowers numerous, in loose racemes; bracts subulate, about 3 mm. long; calyx campanulate, 3 mm. long, with short triangular teeth; corolla about 1·3 cm. long, widely funnel-shaped, puberulous outside; stamens 4, included; fruit subglobose, 4 mm. diam., smooth .. .. .. .. .. .. .. .. .. 1. *filiformis*

Plants glabrous; leaves, etc., as above, but racemes strict and elongated, and calyx-lobes shortly subulate.. .. .. .. .. .. .. .. 2. *Barteri*

1. **M. filiformis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Gerardia filiformis* Schum. & Thonn. *M. scopiformis* Engl.—F.T.A. 4, 2 : 457; Chev. Bot. 480. Slender-branched erect herb 1–2 ft. or more high, woody below, with pink or pale purple flowers darker streaked in the tube, ½ in. long.
Senegal: Casamance (Feb.)! Gambia: in rice-fields! French Guinea: Futa-Jallon, Kouria, Timbo, Ditinn, Dalaba-Diaguissa, 3,000–4,000 ft. (Sept., Oct.)! Ivory Coast: Mankono (June)! Gold Coast: Shai Plains (Jan.)! Ningo and Prampram. Togo: Lome! N. Nigeria: Abinsi, in rice-fields and swamps (Dec.)! Extends to E. Africa, south to Nyasaland, Rhodesia and Angola; also in Madagascar. Exsicc.—*Johnson* 576. *Dalz.* 710 (partly). *Dawe* 33. *Warnecke* 271.

2. **M. Barteri** *Skan*—F.T.A. 4, 2 : 458; Chev. Bot. 480. Like the last.
Ivory Coast: Baoulé-Nord, several localities (Aug.)! N. Nigeria: Nupe! Ilorin, Aguji (Oct.)! Zungeru (Oct.)! Kontagora! Abinsi (Dec.)! Exsicc.—*Barter* 755; 1706. *Dalz.* 174; 710 (partly). *Thornton.*

### 10. SCOPARIA Linn.—F.T.A. 4, 2 : 354.

Stems ribbed, glabrous; leaves opposite or whorled, narrowly oblanceolate, narrowed and entire in the lower half, crenulate in the upper part, 2·5–5 cm. long, up to 1·5 cm. broad, glabrous, areolate-punctate below; flowers 1–2 in the upper reduced leaf-axils forming slender racemes; pedicels about 6 mm. long, glabrous; calyx and corolla 2–3 mm. long; capsule globose, 4 mm. diam. .. .. .. *dulcis*

**S. dulcis** *Linn.*—F.T.A. 4, 2 : 354; Stapf 636; Holl. 3 : 506; Chev. Bot. 474. Erect shrubby weed 1–3 ft. high, of broom-like habit, with small white, sometimes bluish flowers usually 4-partite, densely bearded inside.
A common tropical weed! (See Appendix).

### 11. ALECTRA Thunb.—F.T.A. 4, 2 : 362.

Leaves ovate, broadly rounded at the base, 2–3 cm. long, 1·5–2 cm. broad, coarsely dentate in the lower half, 3–5–nerved from the base, setose on both surfaces; spikes up to 15 cm. long, with leafy bracts; calyx-lobes ovate, acuminate; corolla a little longer than the calyx; anther-cells apiculate .. .. .. 1. *senegalensis*

Leaves more or less lanceolate:

Subtending bracts or bracteate leaves much shorter than the flower; leaves small, lanceolate, up to 1 cm. long; calyx 6 mm. long, lobes ovate; corolla 1·5 cm. long 2. *virgata*

Subtending bracts or leaves much longer than the flowers:

Bracts coarsely toothed, narrowly lanceolate; calyx-lobes triangular 3. *communis*

Bracts serrulate, acute; calyx-lobes ovate-triangular .. .. .. 4. *Vogelii*

1. **Alectra senegalensis** *Benth.*—F.T.A. 4, 2 : 371. *A. communis* A. Chev. Bot. 474, not of Hemsl. Erect roughly hispid, slightly branched or simple, ½–2 ft. high, with yellow red-tinged flowers; parasitic on roots of grass and cereals.
French Sudan: Kita (Oct.)! Senegal: Casamance, etc.! Gambia! N. Nigeria: Kontagora (Jan.)! Bauchi Plateau, Naraguta (Aug.)! Vodni, 4,600 ft. (July)! Cameroons Mt., 5,000–7,000 ft. (Nov., Dec.)! Also in E. Africa. Exsicc.—*Leprieur* 9; 10. *Heudelot* 787. *Mann* 1262; 1985. *Brown-Lester* 7; 27. *Dalz.* 153. *Lely* 421; 502. *Dawe* 67. *Chev.* 3295; 3297.

2. **A. virgata** *Hemsl.*—F.T.A. 4, 2 : 369. *A. paludosa* A. Chev. Bot. 475, name only. Stems erect slender leafy, scabrid-pubescent, about 6 in. high, with flowers ½ in. long.
French Guinea: Dalaba! S. Nigeria: Lagos, Yoruba country! Exsicc.—*Millson.* *Chev.* 18896.

3. **A. communis** *Hemsl.*—F.T.A. 4, 2 : 372; Stapf 636. *A. senegalensis* var. *arachidis* A. Chev. Bot. 475. Erect pilose coarse herb 1–3 ft. high, with yellow flowers streaked with red or brown and rather crowded.

Senegal: Casamance! French Guinea: Dalaba-Diaguissa, 3,000–4,000 ft.! Timbo-Ditinn! Liberia: Kakatown! Sierra Leone: Pujehun (Dec.)! Zimmi (Nov.)! Also in Uganda and E. Africa. Exsicc.—*Whyte.* *Deighton* 366; 1515. *Chev.* 3296; 18285; 18428; 18435; 18880.

4. **A. Vogelii** *Benth.*—F.T.A. 4, 2 : 368. Erect herb 9–18 in. high, rather roughly hairy, with yellow or orange red-streaked flowers; parasitic on roots of Guinea-corn, etc.

N. Nigeria: Lokoja, Patti, etc. (Sept.)! Borgu! Sokoto (Oct., Nov.)! Nabardo (Sept.)! S. Nigeria: Ebute Metta, Botanical Station! Also in Angola, and Zambesi, Nyasaland and Ngamiland. Exsicc.—*T. Vogel* 186. *Barter* 789. *Millen* 172. *Dalz.* 356. *Lely* 624.

### 12. **BARTSIA** Linn.—F.T.A. 4, 2 : 458.

Stems scabrid; leaves sessile, lanceolate, crenate, about 3 cm. long and 8 mm. broad, scabrid on the upper surface, setulose below on the nerves; racemes elongated, slender, leafy; flowers solitary in the axils of the reduced leaves; pedicels very short; calyx 6 mm. long, lobes ovate-triangular, scabrid; corolla about 1 cm. long; fruit oblong-ellipsoid, 1 cm. long, appressed-pubescent .. .. .. .. .. *Mannii*

**B. Mannii** *Hemsl.*—F.T.A. 4, 2 : 459. Herbaceous stems 1–3 ft. high, sparingly branched, with bluish-purple flowers $\frac{1}{2}$ in. across.

Cameroons Mt., grasslands, 7,000–9,000 ft. (Nov.–Jan.)! Exsicc.—*Mann* 1264; 1986. *Johnston* 80. *Dunlap* 198.

### 13. **SOPUBIA** Buch.-Ham.—F.T.A. 4, 2 : 444.

Leaves linear-acicular or almost filiform:
  Flowers very small, the calyx 4 mm. long; leaves almost filiform, much curved, about 3 cm. long, glabrous; flowers laxly paniculate; pedicels up to 5 mm. long; corolla 8–10 mm. long; fruit ellipsoid, 6 mm. long .. .. .. 1. *parviflora*
  Flowers larger, the calyx 6 mm. long or more:
    Leaves crowded, the nodes very close together; calyx-lobes densely woolly inside the margin .. .. .. .. .. .. .. .. .. 2. *Mannii*
    Leaves not crowded, the nodes distant; stems sharply angular; leaves acicular, with recurved margins; calyx-lobes triangular, densely woolly inside the margin 3. *simplex*
Leaves linear, scabrid, 3–4 cm. long, rather crowded; stems pilose; calyx-lobes triangular, woolly inside, tube ribbed; corolla about 1·3 cm. long .. 4. *ramosa*

1. **Sopubia parviflora** *Engl.*—F.T.A. 4, 2 : 452. Erect slender branched herb with 4-angled slightly scabrid stems 1–2 ft. high, and subregular flowers less than $\frac{1}{2}$ in. in diameter, yellowish with purple centre.

French Guinea: Kouroussa (Aug.)! Sierra Leone: N. Prov., Materboi (Oct.)! N. Nigeria: Zungeru (Sept.)! Bauchi Plateau, Naraguta (Aug.)! Panshanu (Sept.)! Extends to E. Sudan and Angola. Exsicc.—*Dalz.* 175. *Lely* 524; 604. *Glanville* 22. *Pobéguin* 371 (partly).

2. **S. Mannii** *Skan*—F.T.A. 4, 2 : 450. Erect half-shrubby scabrid plant, 1–2 ft. high, with numerous whorled flowers pink or reddish-purple over $\frac{1}{2}$ in. in diameter, forming terminal racemes.

Cameroons Mt., grassland above the forest up to 10,000 ft. (Jan., Dec.)! Also in Bambuto Mts. Exsicc.—*Mann* 1281; 2003. *Johnston* 2. *Dunlap* 191; 214. *Mildbraed* 10824.

3. **S. simplex** *Hochst.*—F.T.A. 4, 2 : 450; Chev. Bot. 479. Perennial with slender ribbed stems 1–2 ft. high from a stout woody base, and flowers $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter, pink with darker centre, in terminal racemes.

French Sudan: between Niana and Namesa (Feb.)! Between Guienguénia and Moriguéya (Feb.). French Guinea: several localities (Feb.–June)! Erimakuna, Upper Niger (Mar.)! Gold Coast: Afram Plains (Mar.)! Togo: Agome (Mar.)! N. Nigeria: common in grassy bush! S. Nigeria: Ogbomosho! Throughout tropical Africa to S. Africa. Exsicc.—*Barter* (no number). *Sc. Elliot* 224. *Rowland.* *Johnson* 727. *Dalz.* 383; 708. *Lely* 23; 38; P. 38. *Pobéguin* 1014. *Schlechter* 12959. (See Appendix).

4. **S. ramosa** *Hochst.*—F.T.A. 4, 2 : 449; Chev. Bot. 479. Robust erect undershrub, 1–3 ft. high, with ribbed pilose stems, and pink or pale purple flowers darker in the centre, $\frac{1}{2}$–$\frac{2}{3}$ in. in diameter.

French Guinea: Kouroussa (July, Oct.)! Farana, Socourala (Jan.). Togo: Alafanyo! N. Nigeria: Borgu! Kontagora (Nov.)! Bauchi Plateau, Naraguta (Aug.)! Liruwen-Kano Hills! Kadaura (Sept.)! S. Nigeria: Abeokuta! Throughout tropical Africa. Exsicc.—*Barter* 774. *Irving* 100. *Dalz.* 173. *Lely* 545; 594. *Carpenter.* *Pobéguin* 565; 1021. *Krause.*

### 14. **BUCHNERA** Linn.—F.T.A. 4, 2 : 373.

Spikes not head-like, more or less elongated:
  Spikes nearly glabrous or at most shortly and thinly pubescent, very slender, not continuous; leaves linear to lanceolate, shortly pilose or nearly glabrous; bracts linear, reaching to the top of the subulate calyx-lobes; corolla half as long again as the calyx .. .. .. .. .. .. .. .. 1. *leptostachya*
  Spikes hispid, slender, not continuous; leaves narrowly oblanceolate, toothed in the upper half, about 5 cm. long .. ... .. .. .. .. 2. *hispida*
  Spikes hispid, for the most part continuous; bracts much shorter than the calyx; corolla twice as long as the calyx; fruits soon conspicuous on the spike, oblong, 8 mm. long, glabrous, black .. .. .. .. .. .. .. .. 3. *longifolia*
Spikes head-like and short, 1–2 cm. long, leaves linear-lanceolate:
  Leaves nearly glabrous, broad at the base, up to 9 cm. long, entire; calyx-lobes filiform .. .. .. .. .. .. .. .. .. 4. *capitata*
  Leaves pubescent, narrowed to the base, 5–6 cm. long, slightly denticulate; calyx-lobes not filiform .. .. .. .. .. .. .. 5. *bowalensis*

1. **Buchnera leptostachya** *Benth.*—F.T.A. 4, 2 : 394; Holl. 3 : 507; Chev. Bot. 476. Erect slender-branched herb, slightly scabrid, 1–2 ft. or more high, turning black in drying, with small blue-purple flowers (sometimes white) $\frac{1}{4}$ in. long in very narrow interrupted spikes; a parasite like the other species.

Senegal! Gambia! Sierra Leone: French Guinea: Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Sept., Oct.)! Sierra Leone: Wallia (Feb.)! Freetown, Tower Hill (Dec.)! Bumban Hills!

N. Nigeria: Nupe! Kontagora (Nov., Dec.)! Gombe! Extends to Upper Nile Land and E. Africa. Exsicc. —*Leprieur* 7; 613. *Barter* 907. *Brown-Lester* 42. *Sc. Elliot* 4266. *Dalz.* 160. *Lely* 656. *Deighton* 793; 1251.

2. **B. hispida** *Buch.-Ham.*—F.T.A. 4, 2: 397; Chev. Bot. 475. Erect herb, simple or slightly branched above, scabrid and hispid, with small bluish-purple flowers ⅓ in. long.

Senegal: Oualia, Thiès, etc. (Dec.)! Gambia! French Guinea: Kouroussa (Oct.)! N. Nigeria: Kontagora (Nov.)! Katagum (Oct.)! In tropical Africa generally; also Madagascar and India. Exsicc.—*Heudelot* 132. *Boteler.* *Dalz.* 106; 172. *Pobéguin* 566.

[illegible]. **B. longifolia** *Klotzsch*—F.T.A. 4, 2: 398. Erect robust branched herb, woody below, up to 2⅓ ft. high, hispid, with narrow tubular bluish flowers ¼–⅓ in. long, crowded in the upper part of the spikes which may reach over 1 ft. in length.

Senegal! Gambia: common (Jan.)! Sierra Leone: Berria (Mar.)! Extends to Eritrea, and south to Portuguese E. Africa. Exsicc.—*Leprieur* 8. *Ingram.* *Brown-Lester* 62. *Sc. Elliot* 5217. *Dalz.* 8063.

4. **B. capitata** *Benth.*—F.T.A. 4, 2: 381. Erect herb 1–3 ft. high, simple or slightly branched, woody below, nearly glabrous, turning very black, with small white or lilac flowers in dense ovoid or cylindric heads.

Ivory Coast: Baoulé-Nord, Nzi Valley, Mbayakro and vicinity! N. Nigeria: Yola (Jan.)! Tangale (Oct.)! Extends to E. Africa and Madagascar. Exsicc.—*Dalz.* 116. *Lely* 659. *Chev.* 22248; 22300.

5. **B. bowalensis** *A. Chev.* in Bull. Soc. Bot. Fr. Mém. 8d: 185. Erect slender herb up to 18 in. high; spikes short, 2–2·5 cm. long; flowers greenish-white, ¼ in. long.

French Guinea: Futa-Jallon, Dalaba-Diaguissa Plateau, 3,600 ft. (Oct.)! Bouria (Sept.)! Exsicc.—*Chev.* 18461; 18867.

### 15. **CYCNIUM** E. Mey.—F.T.A. 4, 2: 430.

Leaves narrowed to the base, often slightly petiolate, oblong-oblanceolate, serrulate, up to 8 cm. long and 3 cm. broad, scabrid; flowers supra-axillary; pedicels about 1·5 cm. long, glandular-pubescent; calyx 1·5 cm. long, lobes unequal, ovate; corolla-tube 4·5 cm. long, pubescent outside; limb about 5 cm. diam. .. 1. *camporum*

Leaves sessile, ovate, rounded at the base, 3–4·5 cm. long, 1–2·5 cm. broad, densely glandular-scabrid, irregularly serrulate; flowers slightly supra-axillary; pedicels 2 cm. long, with two leafy bracts at the top; calyx 2 cm. long, glandular-tomentellous, lobes ovate; corolla-tube 3·5–4 cm. long, unilaterally constricted above the middle, glandular-pilose, limb 3–4 cm. diam. .. .. .. .. 2. *petunioides*

1. **C. camporum** *Engl.*—F.T.A. 4, 2: 432; Chev. Bot. 479. A low bushy herb much-branched from a woody base, 1–3 ft. high, pilose and scabrid, drying black, with brilliant white (sometimes maculate) petunia-like flowers which dry a deep indigo to black.

In grass and bush savannah from French Sudan and French Guinea to N. and S. Nigeria! Extends to E. Sudan, Uganda and Congo Basin. Exsicc.—*Barter* 3398. *Rowland.* *Sc. Elliot* 5729. *Johnson* 962. *Phillips* 29. *Foster* 187. *Dalz.* 29 (Gold Coast); 361. *Collenette* 4; 5. *Dent Young* 183. *Baumann.* *Schlechter* 12949. (See Appendix).

2. **C. petunioides** *Hutch.* in Kew Bull. 1921: 251. Habit of the last, with similar flowers but a larger calyx.

N. Nigeria: Bauchi Plateau, Jos (Mar.)! Naraguta (Jan.)! Exsicc.—*Hill* 17. *Lely* 17; P. 135.

### 16. **RHAMPHICARPA** Benth.—F.T.A. 4, 2: 418.

Whole plant drying blackish; leaves pinnatisect into slender filiform segments, glabrous; flowers axillary, solitary; pedicels up to 3·5 cm. long; calyx-lobes ovate, long-acuminate, 6 mm. long; corolla 4 cm. long, the tube very narrow, broader towards the top; fruit ovoid, 1 cm. long, venose, glabrous .. .. *fistulosa*

**R. fistulosa** *Benth.*—F.T.A. 4, 2: 419; Chev. Bot. 479. Erect much-branched glabrous herb usually a few inches to 1 ft. high, sometimes exuberant, and half-woody below, with finely divided leaves and white tubular flowers expanded to ½–⅔ in. diameter in the limb.

French Sudan: Kabarah (Aug.)! Ianfola (Mar.); Folo; Djenné, Koulikoro, etc., swamps and inundated places! Senegal: St. Louis Island! French Guinea: Kouroussa (Aug.)! Futa-Jallon, Timbo to Ditinn (Sept.); Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Sept., Oct.). N. Nigeria: Jebba! Sokoto (Sept., Oct.)! Ibi (July)! Yola (Sept.)! Panshanu (Sept.)! In tropical Africa generally, S. Africa and Madagascar. Exsicc.—*Leprieur.* *Barter* 1713. *Dalz.* 120; 364. *Moiser* 115. *Hepburn* 29. *Lely* 605. *Pobéguin* 373.

### 17. **STRIGA** Lour.—F.T.A. 4, 2: 399.

Leaves well developed:

Calyx 10- or more-ribbed:

Inflorescence loose-flowered, the flowers not forming a continuous spike:

Calyx about 6 mm. long, setulose on the ribs; leaves entire, linear, setulose-pubescent, about 2 cm. long; corolla about twice as long as the calyx, glabrous outside 1. *asiatica*

Calyx over 1 cm. long, scabrid on the nerves; leaves distantly dentate, linear. lanceolate, up to 9 cm. long, scabrid; corolla about 3 times as long as the calyx, nearly glabrous outside .. .. .. .. .. .. .. 2. *Forbesii*

Inflorescence dense-flowered, the flowers forming a continuous spike up to 10 cm. long:

Leaves linear-lanceolate, coarsely dentate, up to 8 cm. long, strongly nerved and scabrid; calyx about 7 mm. long; corolla-tube about 2 cm. long, glabrous 3. *macrantha*

Leaves oblong-lanceolate, slightly crenulate, 3–4 cm. long, very roughly scabrid-setulose; corolla-tube 1 cm. long, shortly glandular-puberulous outside 4. *Klingii*

Leaves linear, entire, 3 cm. long, like the stems densely hispid-setose; spikes about 5 cm. long; bracts linear-lanceolate, 2 cm. long, hispid; corolla-tube 2 cm. long, lobes 1 cm. long .. .. .. .. .. .. .. .. 5. *Dalzielii*

Calyx 5-ribbed :

Stems markedly angular-ribbed, shortly pubescent ; leaves linear, up to 6 cm. long, scabrid-pubescent ; spikes slender, not quite continuous ; calyx-teeth very short and subulate, the tube about 7 mm. long in fruit ; corolla pubescent outside, much curved above the middle .. .. .. .. .. .. 6. *Rowlandii*

Stems at most obtusely angular :

Corolla-lobes 1 cm. long or more ; tube 2 cm. long, slightly pubescent towards the top ; leaves linear, up to 7 cm. long, slightly scabrid ; flowers rather densely spicate ; bracts lanceolate, markedly pectinate-ciliate ; calyx-lobes very short 7. *senegalensis*

Corolla-lobes about 5 mm. long :

Corolla-tube glabrous or nearly so :

Calyx-lobes filiform ; corolla-tube about 1·3 cm. long, curved and expanded towards the top ; leaves linear-filiform, scabrid ; spikes slender, lax-flowered 8. *aspera*

Calyx-lobes subulate ; corolla-tube 1 cm. long, nearly straight ; leaves rigidly linear-acicular, scabrid, up to 2·5 cm. long ; spikes slender, lax-flowered 9. *brachycalyx*

Corolla-tube rather densely pubescent outside, about 1 cm. long, curved towards the top :

Calyx about 7 mm. long, lobes subulate ; leaves linear, 2·5 cm. long, shortly pubescent ; stems usually much-branched .. .. .. .. 10. *Barteri*

Calyx about 3 mm. long, lobes subfiliform ; leaves 2–3 cm. long, glabrous ; stems simple .. .. .. .. .. .. .. .. 11. *aequinoctialis*

Leaves much reduced, short and subulate ;

Corolla-tube at most 1 cm. long ; limb rather small :

Calyx 5-ribbed :

Branches usually numerous, drying black, thinly pubescent ; corolla glabrous 12. *gesnerioides*

Branches few (up to 3), drying grey, shortly appressed-scabrid ; corolla scabrid 13. *strictissima*

Calyx about 10-ribbed, 1 cm. long ; branches elongated, drying grey, quite glabrous ; leaves glabrous, subulate-lanceolate, about 5 mm. long ; corolla glabrous 14. *Baumannii*

Corolla-tube over 1 cm. long, pubescent ; limb about ½–⅓ as long as the tube ; stems shortly pubescent ; whorls of flowers rather distant, occupying the most of the stem 15. *primuloides*

1. **Striga asiatica** *O. Kuntze* Rev. Gen. Pl. 466. *S. lutea* Lour.—F.T.A. 4, 2 : 409 ; Chev. Bot. 477 (including *S. hirsuta*). Erect slender parasitic herb usually 6–9 in. high, simple or branched, scabrid or harshly pubescent, with slender flowers ½–¾ in. long, bright yellow or brilliant scarlet (occasionally white).

Throughout the area, on roots of grass in savannah and stony places ! General in tropical Africa, S. Africa, the Mascarenes, and in tropical Asia. Exsicc.—*Barter* 538. *Morson.* *Dalz.* 111 ; 112 ; 113 ; 126 ; 163 ; 164 ; 544 ; 1390. *Lely* 254 ; 525. *Dent Young* 184a. *Talb.* 1034. *Collenette* 59.

2. **S. Forbesii** *Benth.*—F.T.A. 4, 2 : 410. Erect herb, simple or little-branched, 6–15 in. high, scabrid-pubescent, with salmon-pink (sometimes scarlet or yellow) flowers 1–1½ in. long solitary in the upper axils.

Senegal ! N. Nigeria : Zungeru (July, Aug.) ! Yola (June) ! Bauchi Plateau, Vom, 3,000–4,500 ft. ! Neill's Valley (June) ! In tropical Africa generally, S. Africa and Madagascar. Exsicc.—*Leprieur* 5. *Dalz.* 109 ; 167. *Lely* 255. *Dent Young* 184.

3. **S. macrantha** *Benth.*—F.T.A. 4, 2 : 413 ; Chev. Bot. 477. *Buchnera macrantha* Engl.—Chev. Bot. 475. Robust herb 2–4 ft. or up to 6–7 ft. high, with 4-angular stems sparingly branched above, turning blackish in drying ; flowers white 1 in. long.

French Sudan : Nafadié to Ouacoro ! Senegal ! Gambia to Sierra Leone : fairly common in grass ! Ivory Coast : Ano (Dec.) ! Gold Coast : Salaga ! Togo : Ho (Dec.) ! Bismarckburg, etc. N. Nigeria : Nupe ! Kontagora (Dec.) ! Sokoto (Nov.) ! Abinsi and Katsena Allah (Nov., Dec.) ! S. Nigeria : Lagos Colony, Idofun, Ado, etc. ! Lagos ! Also in North Ubangi-Shari and Angola. Exsicc.—*Heudelot* 607. *Barter* 985. *Brown-Lester* 34. *Sc. Elliot* 4174 ; 4455 ; 5677. *Millson* 39. *Rowland.* *Millen.* *Dalz.* 169 ; 711. *Lely* 692. *Krause.* *Chev.* 3275.

4. **S. Klingii** *Skan*—F.T.A. 4, 2 : 413. Erect herb 1 ft. high, harshly hairy, with pink or red flowers about ½ in. long in cylindrical spikes with stiff sharp hairs on the bracts and calyx.

Togo : Assumafaru ; Ketschem Timoy. N. Nigeria : Borgu ! Rinji (Nov., Dec.) ! Exsicc.—*Barter* 758. *Lely* 680.

5. **S. Dalzielii** *Hutch.* in Kew Bull. 1931 : ined. Habit of the last, 18 in. high, with pink flowers ¾ in. long.

N. Nigeria : Zungeru (Sept.) ! Exsicc.—*Dalz.* 168.

6. **S. Rowlandii** *Engl.*—F.T.A. 4, 2 : 405 ; Chev. Bot. 478. Erect herb a few inches up to 1½ ft. high, with small curved flowers ½–⅔ in. long, pink or lilac with purplish tube ; facultative parasite on grass, sometimes independent.

French Sudan : Dougoura (Feb.) ! San. Gambia ! Senegal : Casamance. French Guinea : ? locality ! Futa-Jallon, several localities ; near sources of Upper Sassandra. Sierra Leone : Falaba, common on schistose hills (Mar.) ! Gold Coast : Afram Plains (Mar.) ! N. Nigeria : Nupe ! Kaduna (Mar.) ! Zaria, in bush after burning (Feb.) ! Bauchi Plateau, Liruwen-Kano Hills ! Vom, 3,000–4,500 ft. ! Naraguta (Jan.) ! S. Nigeria : Lagos Colony ! Exsicc.—*Barter* 1169. *Rowland.* *Sc. Elliot* 5207. *Johnson* 709. *Dalz.* 407. *Hill* 51. *Carpenter.* *Dent Young* 185. *Lely* P. 83. *Hayes* 539. *Pobéguin* 364 (bis).

7. **S. senegalensis** *Benth.*—F.T.A. 4, 2 : 408. Erect, usually branched, 1–2 ft. high, scabrid or roughly hairy, with red-purple or pink flowers varying in size and spread of corolla limb, ½–1¼ in. long ; a common parasite on cereals.

Senegal and Gambia ! Gold Coast : N. Terr. ? locality ! N. Nigeria : very common ! S. Nigeria : Abo ! Extends to Abyssinia, Mozambique and S.W. Africa. Exsicc.—*Heudelot.* *T. Vogel* 130. *Ansell.* *Barter* 136 ; 866. *Baikie.* *Ingram.* *Elliott* 128. *Dalz.* 171. *Lely* 590. *Talb.* 310. (See Appendix).

8. **S. aspera** *Benth.*—F.T.A. 4, 2 : 403 ; Chev. Bot. 478. *S. Passargei* Engl.—Chev. Bot. 476. Slender erect slightly hispid herb, 6–18 in. high, with narrow curved flowers ½ in. or more long, cream-white with purple centre or reddish with darker markings.

French Sudan: Ségou (Sept.)! Koulikoro! Mossi! Senegal and French Guinea: various localities, up to 5,000 ft. in Futa-Jallon! Gold Coast: Ningo. N. Nigeria: Lokoja (Sept.)! Jebba! Kontagora (Nov.)! Sokoto (July)! Bauchi Plateau, Naraguta (June, Aug.)! Alkalire (Sept.)! Vom, 3,000–4,500 ft.! Yola (July)! Exsicc.—*Roger*. *Heudelot* 165. *T. Vogel* 15. *Barter* (no number). *Dalz.* 110; 170; 355. *Lely* 278; 532; 640. *Dent Young* 186. *Pobéguin* 1020. *Chev.* 3285; 18475; 18558; 18560; 24415; 24616; 24718.

9. **S. brachycalyx** *Skan*—F.T.A. 4, 2: 403; Chev. Bot. 476. *S. Warneckei* Engl. Erect rigid branched herb 1–1½ ft. high, scabrid, with reddish narrow flowers about ½ in. long; parasitic, in Guinea-corn fields, etc.
Togo: Lome! Basari savannah! N. Nigeria: Jebba! Abinsi (Nov.)! Bogalo, Benue R.! Exsicc.—*Barter* (no number). *Dalz.* 790. *Warnecke* 201. *Kersting* A. 665.

10. **S. Barteri** *Engl.*—F.T.A. 4, 2: 406. Erect branched finely pubescent herb, 6–8 in. high, with small narrow whitish or lilac-purple flowers.
N. Nigeria: Nupe, parasitic on roots of grasses! Also in Shari-Chad. Exsicc.—*Barter* 1170.

11. **S. aequinoctialis** *A. Chev.* Bot. 476, name only. Erect herb 6–18 in. high, simple or sparingly branched, nearly glabrous, turning quite black in drying, with small pale lilac or whitish flowers ⅓–½ in. long.
French Guinea: Guerzé country, Mt. Nzo, 5,000 ft. (Mar.)! Siredougou, N.W. of Beyla (Apr.)! Exsicc.—*Chev.* 21035. *Collenette* 3. *Pobéguin* 782.

12. **S. gesnerioides** *Vatke* in Oest. Bot. Zeitschr. 1875: 11. *S. orobanchoides* Benth.—F.T.A. 4, 2: 402; Chev. Bot. 477. Stiff erect branched, 3–18 in. high, with half-succulent stems from a thickened base, nearly glabrous, the leaves reduced to scales, with flowers ½ in. or more long, brownish-red, or flesh-coloured or nearly white; parasitic in corn-fields or on roots of many other plants.
French Sudan and Senegal: several localities! Sierra Leone: Buyabuya, Scarcies R. (Feb.)! Togo: Lome! N. Nigeria: Lokoja! Sokoto (Aug., Nov.)! Bauchi Plateau, Naraguta (Aug.)! Yola Prov., Kilba (Aug.)! Also in Cape Verde Islands, S. Africa and through Arabia to India. Exsicc.—*Heudelot* 540. *T. Vogel* (no number). *Sc. Elliot* 4279. *Farmar* 131. *Dalz.* 300; 357. *Moiser* 63. *Lely* 489. *Chev.* 3280. *Warnecke* 189. (See Appendix).

13. **S. strictissima** *Skan*—F.T.A. 4, 2: 407. *S. canescens* A. Chev. (? of Engl.). Erect simple or little-branched herb, with ribbed greyish-pubescent stems 1–2 ft. high, and pale pinkish or whitish-lilac flowers ⅓–½ in. long.
French Guinea: ? locality! Ivory Coast: savannah at confluence of Sassandra and Bafing R.! Gold Coast: Accra Plains (Jan.)! N. Nigeria: Nupe! Lokoja, common (Apr.)! Bauchi Plateau, Lemme, 2,600 ft. (May)! Exsicc.—*Barter* 1263. *Dalz.* 145. *Parsons* 117. *Lely* 146. *Irvine* 146. *Pobéguin* 364. *Chev.* 21775.

14. **S. Baumannii** *Engl.*—F.T.A. 4, 2: 414. Tall glaucous herb 2 or more ft. high, branched, with leaves reduced and adpressed to the stem, and very small narrow flowers ⅓ in. long dull yellow or brownish-red in a long slender spike; roots subsucculent from a fairly stout stock; parasitic.
Sierra Leone: ? localities! N. Prov., Kumrabai, in grass fields (Jan.)! Togo: Misahöhe; Quamikrum (Mar.)! N. Nigeria: Abinsi, fairly common in grass (Mar.)! Exsic.—*Sc. Elliot* 5085. *Dalz.* 709. *Glanville* 148. *Schlechter* 12954.

15. **S. primuloides** *A. Chev.* in Bull. Soc. Bot. Fr. Mém. 8d: 185; Chev. Bot. 478. Erect, leafless parasite 6–15 in. high, with primrose-yellow flowers ¾ to nearly 1 in. long.
Ivory Coast: Anoumaba (Nov.)! Upper Sassandra, Toura country, on Mt. Dourou, 1,800–2,500 ft. (May)! Exsicc.—*Chev.* 21714; 22404.

### 18. ARTANEMA Don—F.T.A. 4, 2: 327.

Stems glabrous; leaves opposite, broadly lanceolate, acutely acuminate, shortly petiolate, up to 15 cm. long and 4 cm. broad, serrulate except the cuneate base, scabrid on the upper surface towards the margin; racemes about 15 cm. long; pedicels 1 cm. long; calyx-segments ovate, 8 mm. long, glabrous; corolla 3 cm. long, glabrous; fruit globose, about 1·3 cm. diam. .. .. .. .. *longifolium*

**A. longifolium** *Vatke* in Linnaea 43: 307. *Columnea longifolia* Linn. *A. sesamoides* Benth.—F.T.A. 4, 2: 327; Chev. Bot. 471. Erect branched herb with 4-angular stems and red-purple or bluish-violet flowers 1–1¼ in. long.
Ivory Coast and Gold Coast: fairly common in wet places or in standing water! Togo: ? locality. Dahomey: between Savé and the Ouémé (May). S. Nigeria: Ebute Metta (Nov.)! Olokemeji! Oyo! Ndoni! Abeokuta! Extends to Congo and Uganda; also in tropical Asia. Exsicc.—*Barter* 1769. *Irving. Moloney.* *Millen* 4. *Cummins* 53–60. *Brown* 381. *Fishlock* 37. *Foster* 119. *Dalz.* 146. (See Appendix).

### 19. LINDERNIA Allioni—F.T.A. 4, 2: 337.

Leaves narrowly lanceolate, about 1 cm. long, glabrous; flowers in small spikes; calyx-segments linear-filiform; corolla 4 mm. long .. .. .. 1. *debilis*

Leaves ovate or ovate-lanceolate:

Calyx at most 4 mm. long, lobes setulose-pubescent outside; pedicels spreading at right angles, 1·5 cm. long; corolla 1 cm. long; leaves ovate, serrulate, setulose on the upper surface, about 1 cm. long .. .. .. 2. *nummulariaefolia*

Calyx 8–10 mm. long, lobes glabrous or very nearly so outside:

Fruit linear, very narrow and with a sharp beak:

Leaves ovate-orbicular, crenulate, glabrous, minutely punctate below, about 1 cm. diam.; pedicels about 1 cm. long; calyx 1 cm. long, glabrous; fruit 2 cm. long, very acute .. .. .. .. .. .. .. .. .. 3. *Vogelii*

Leaves ovate-lanceolate, serrulate, 3–4 cm. long, about 1·5 cm. broad, glabrous; calyx 1 cm. long, lobes narrowly lanceolate; fruit 1·5 cm. long 4. *senegalensis*

Fruit narrowly lanceolate; stems diffuse, rooting at the nodes, branches pubescent; leaves ovate to suborbicular, serrulate, 1·5–3 cm. long and 2·5 cm. broad; calyx 7 mm. long, lobes subulate, very acute, slightly pubescent .. .. 5. *diffusa*

1. **Lindernia debilis** *Skan*—F.T.A. 4, 2: 344. A small herb 1–4 in. high or prostrate, with glabrous 4-angular branches and small purplish flowers, yellow on the lower lip.
N. Nigeria: Lokoja and Yola, damp places (Nov.)! Also in Upper Nile Land. Exsicc.—*Dalz.* 128.

2. **L. nummulariaefolia** *Wettst.*—F.T.A. 4, 2: 341. Erect herb 2–5 in. high, sparingly setulose, with lilac and white flowers ¼–⅓ in. long, mostly solitary in the upper axils.
N. Nigeria: Bauchi Plateau, Naraguta (Aug.)! Cameroons Mt., Buea. Also in Angola. Exsicc.—*Lely* 518. *Preuss.*

3. **L. Vogelii** *Skan*—F.T.A. 4, 2: 339; Chev. Bot. 473, partly. A slender glabrous herb, procumbent, sparingly branched, with white and pink flowers ⅓ in. long, axillary solitary.

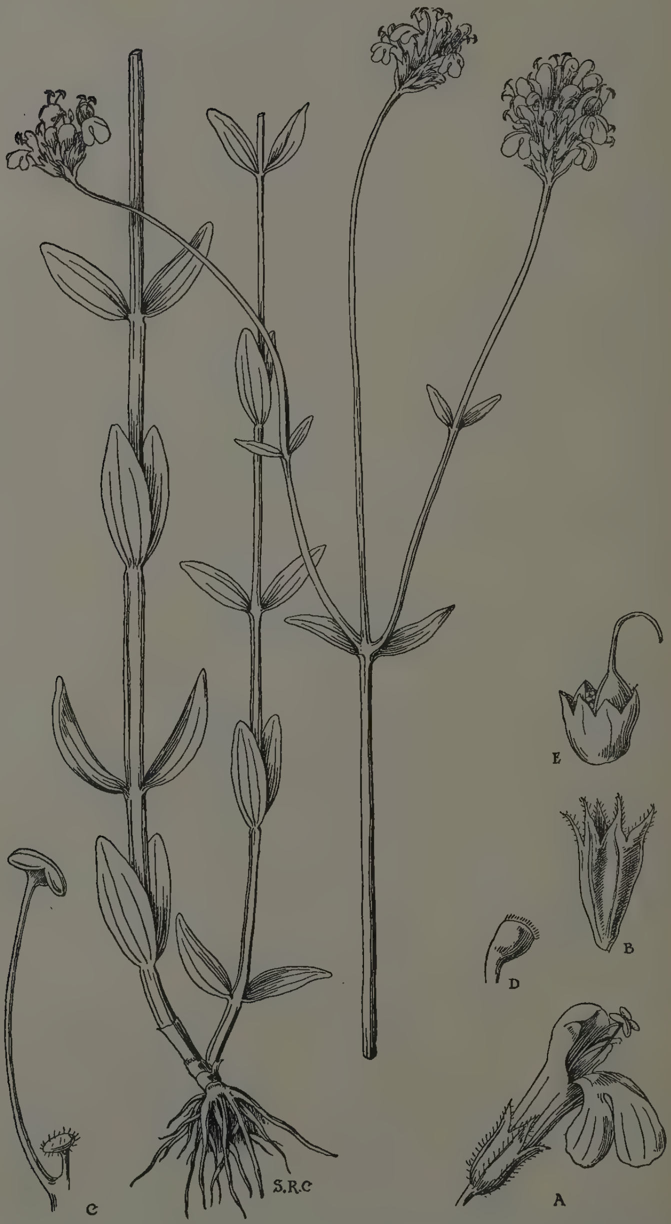

FIG. 255.—CRATEROSTIGMA SCHWEINFURTHII *Engl.* (SCROPHULARIACEAE). A, flower. B, calyx. C, stamen and staminode. D, stigma. E, young fruit.

Ivory Coast: Agniéby Valley, Makougnié, in forest (Jan.)! Cavally Basin, Tepo country (July)! S. Nigeria: Akassa (Aug.)! Brass! Exsicc.—*T. Vogel* 1. *Barter* 27. *Chev.* 17061; 19587.

4. **L. senegalensis** *Skan*—F.T.A. 4, 2: 339; Chev. Bot. 473. Ascending branched herb with 4-angular slightly pubescent stems becoming glabrous, and white or lilac flowers ⅓ in. long, axillary, solitary.

Senegal! French Guinea: Futa-Jallon, between Timbo and Ditinn (Sept.)! Sierra Leone: in wet places, Talla Hills, etc. (Feb.)! Exsicc.—*Heudelot* 804. *Barter* (no number). *Sc. Elliot* 5031.

5. **L. diffusa** *Wettst.*—F.T.A. 4, 2: 338; Stapf 636; Holl. 3: 506; Chev. Bot. 473. A pubescent, much-branched creeping herb of wet places and roadsides, with flowers ⅓ in. long, white or lilac and pink with yellow throat, solitary, axillary.

A common weed! Also in Madagascar and tropical America. Exsicc.—*T. Vogel* 111. *Barter* 1766. *Munn* 468; 1441. *Sc. Elliot* 4013. *Johnson* 696. *Whyte.* *Preuss* 1184. *Schlechter* 12341. (See Appendix).

### 20. **HYDRANTHELIUM** H.B. & K.—F.T.A. 4, 2: 351.

Stems prostrate, glabrous; leaves opposite, broadly obovate-spathulate, undulate on the margin, broadly cuneate into the petiole, about 2 cm. long and 1 cm. broad, with 5 nerves ascending from the base, glabrous; flowers axillary and solitary; pedicels 1 cm. long; calyx-segments oblong, 5 mm. long; corolla 5 mm. long, unequally 3–5-lobed; stamens 2–5 .. .. .. .. .. .. .. .. *egense*

**H. egense** *Poepp. & Endl.*—F.T.A. 4, 2: 351. A creeping herb of muddy stream margins, with white fragrant flowers. S. Nigeria: Onitsha! Also in Congo Basin, and in tropical America. Exsicc.—*Barter* 1252.

### 21. **CRATEROSTIGMA** Hochst.—F.T.A. 4, 2: 328.

Stems prominently ribbed, glabrous; leaves opposite, sessile, the lower ovate, the upper lanceolate, 2–3 cm. long, 3-nerved from the base, minutely gland-dotted below; flowers in terminal heads or short spikes about 2 cm. long; bracts subulate, 3–4 mm. long; calyx 6 mm. long, tube glabrous, teeth subulate-triangular, short, scabrid; corolla-tube 6 mm. long, densely puberulous, 2-lipped .. .. *Schweinfurthii*

**C. Schweinfurthii** *Engl.*—F.T.A. 4, 2: 332; Chev. Bot. 472. *Torenia Schweinfurthii* Oliv. in Hook. Ic. Pl. t. 1251. Erect or sometimes decumbent herb, 6–18 in. high, stems and leaves sometimes purple-tinged, with blue or violet flowers ⅓ in. long.

Senegal: Casamance, Sédhiou to Tambanaba (Feb.)! French Guinea: Futa-Jallon, several localities, 3,000–4,000 ft. (Sept.–Dec.)! Gold Coast: Yeji (July)! Dahomey: Atacora Mts., Kouandé, near Birni (June)! N. Nigeria: Nupe! Kontagora (Nov.)! Extends to E. Sudan and to Angola. Exsicc.—*Barter* (no number). *Dalz.* 165. *Vigne* 1256.

### 22. **TORENIA** Linn.—F.T.A. 4, 2: 334.

Flowers on slender pedicels up to 2·5 cm. long; leaves ovate to lanceolate, petiolate, 3–4 cm. long, crenulate-serrate, glabrous; calyx 1 cm. long, glabrous; corolla about 1 cm. long; fruit 6 mm. long .. .. .. .. .. .. 1. *parviflora*

Flowers subsessile, in leafy spikes; leaves oblanceolate, denticulate, narrowed to the base, up to 3·5 cm. long, 3-nerved from above the base, glabrous; calyx 4–5 mm. long, segments ovate-elliptic, with hyaline margins; corolla 4 mm. long 2. *spicata*

1. **T. parviflora** *Buch.-Ham.*—F.T.A. 4, 2: 335; Chev. Bot. 472. Slender branched creeping and decumbent herb, sparingly pilose or glabrous, with flowers ⅓ in. long, pale blue or white and purplish-tinged, solitary or 2–6 together in the axils, with a narrowly winged calyx.

Senegal to Cameroons and Fernando Po! Extends to Madagascar, tropical Asia and America. Exsicc.—*Barter* 1199. *Mann* 1442. *Sc. Elliot* 4215. *Farmar* 50. *Dalz.* 125; 156; 521; 701; 1237. *Schlechter* 12339. (See Appendix).

2. **T. spicata** *Engl.*—F.T.A. 4, 2: 334. *Pseudolobelia humilis* A. Chev. Bot. 480. Erect glabrous herb simple or branched, the stems acutely 4-angular, 3–9 in. high, with small blue (sometimes pink or white) flowers.

Futa-Jallon: between Timbo and Ditinn, 2,100 ft. (Sept.)! N. Nigeria: Yola (July)! Bauchi Plateau, Kadaura (Sept.)! Extends to E. Africa, and south to Transvaal and to Angola. Exsicc.—*Dalz.* 127. *Lely* 603. *Chev.* 18497.

### 23. **DOPATRIUM** Hamilt.—F.T.A. 4, 2: 324.

Calyx 5 mm. long, broadly lanceolate, subacute; corolla-tube 1·5 cm. long, slightly pubescent; limb about 2 cm. across; stems glabrous; basal leaves lanceolate-oblong, about 2 cm. long, glabrous, stem leaves triangular, 3–4 mm. long; raceme few-flowered; pedicels up to 2 cm. long in fruit, becoming reflexed; fruit globose, 6 mm. diam., glabrous .. .. .. .. .. .. .. 1. *longidens*

Calyx about 2–3 mm. long:

Raceme with numerous closely approximated nodes (about 5 mm. apart); basal leaves ovate-lanceolate, subacute, about 1 cm. long, glabrous; stem-leaves ovate, acute, 5 mm. long; pedicels slender, spreading at right angles and up to 1·5 cm. long; calyx-segments ovate-acute, 3 mm. long; corolla-tube 1 cm. long 2. *senegalense*

Raceme with few and distant nodes; basal leaves linear-oblanceolate, 2–3·5 cm. long with a cartilaginous margin; stem-leaves 2 mm. long; flowers very few; pedicels up to 1·5 cm. long; corolla-tube 6 mm. long ... .. .. .. 3. *Dawei*

1. **D. longidens** *Skan*—F.T.A. 4, 2: 325. Erect slender herb, 6–15 in. high, usually simple, tufted with conspicuous violet-purple flowers nearly 1 in. long with a pale blotch on the lower lip; habitat in rock pools, the lower leaves submerged.

N. Nigeria: Nupe! Zungeru (Sept.)! Bauchi Plateau, several localities (Aug.)! Mada Hills (Aug.)! Kilba, Yola Prov. (Aug.)! S. Nigeria: Olokemeji! Exsicc.—*Barter* 1683. *Dalz.* 117; 162. *Lely* 526. *Dent Young.* *Carpenter.* *Hepburn* 65. *Foster* 311.

2. **D. senegalense** *Benth.*—F.T.A. 4, 2: 326. *D. Peulhorum* A. Chev. Bot. 471. Slender erect herb usually sparingly branched, 6–12 in. high, with delicate purple flowers about ½ in. long.

Senegal ! French Guinea : Kindia, in a swamp ! Futa-Jallon, several localities (Sept.) ! Sierra Leone : Scarcies, Buyabuya (Feb.) ! N.E. part of Sierra Leone, ? locality ! Exsicc.—*Heudelot* 138. *Garrett. Sc. Elliot* 4275b. *Farmar* 199a. *Chev.* 18554 ; 18623 ; 18657.

3. **D. Dawei** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Erect simple or slightly branched herb, tufted, 6–12 in. high, with purple flowers ½ in. long ; in shallow pools on rocks or in running water.

Sierra Leone : Moyamba (Aug.) ! Bunkababe ! Binkolo, N. Prov. (Aug.) ! Exsicc.—*Dawe* 493 ; 568. *Deighton* 1280.

## 24. ILYSANTHES Rafin.—F.T.A. 4, 2 : 345.

Leaves obovate, about 1 cm. long and up to 7 mm. broad, 3-nerved from the base, entire, minutely punctate below ; flowers solitary, axillary ; pedicels at length spreading-reflexed, up to 1·5 cm. long ; calyx-segments linear, 2 mm. long ; corolla 5 mm. long .. .. .. .. .. .. .. .. 1. *parviflora*

Leaves linear or subulate-linear, 1-nerved :

Leaves linear-oblanceolate, 1–1·5 cm. long, glabrous ; pedicels up to 1 cm. long in fruit ; calyx nearly 2 mm. long ; teeth unequal ; corolla about 4 mm. long ; fruit 0·8 cm. long .. .. .. .. .. .. .. .. .. 2. *gracilis*

Leaves subulate-linear, about 5 mm. long, glabrous ; pedicels up to 5 mm. in fruit, reflexed ; calyx 3 mm. long ; corolla 7 mm. long .. .. .. 3. *Barteri*

1. **I. parviflora** *Benth.*—F.T.A. 4, 2 : 346. *Dopatrium baoulensis* A. Chev. Bot. 471. Slender, erect or decumbent, branched herb of wet places, 3–9 in. high, nearly glabrous, with small blue and white flowers.

Ivory Coast : Baoulé-Nord, Nzi Valley, between Alangouassou and Mbyakro (Aug.) ! N. Nigeria : Gombe district (Oct.) ! In tropical Africa generally ; also in India and Siam. Exsicc.—*Lely* 665. *Chev.* 22250.

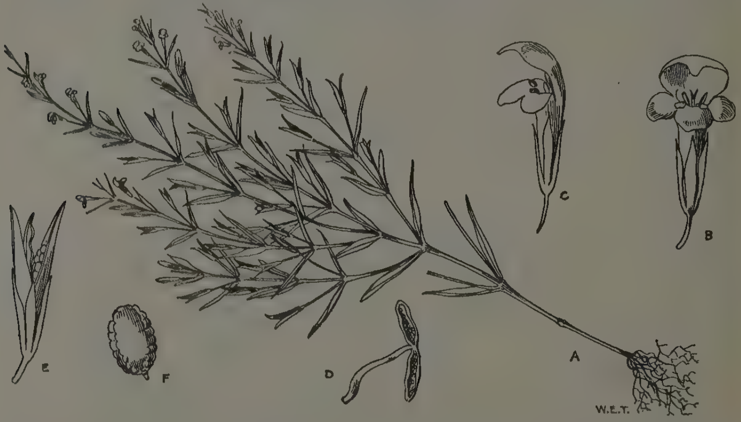

FIG. 256.—ILYSANTHES GRACILIS *Skan* (SCROPHULARIACEAE).

A, whole plant. B, front view of flower and C, side view. D, stamen. E, capsule. F, seed.

2. **I. gracilis** *Skan*—F.T.A. 4, 2 : 349 ; Chev. Bot. 474, partly. Erect slender herb 3–6 in. high, simple or freely branched, nearly glabrous, with small pink and white or lilac flowers, solitary, axillary.

Ivory Coast : Baoulé-Nord, Bouaké, Mt. Lémélébou (July) ! Langouassou to Fétékro (July) ; Kodiokoffi to Kondroko (Aug.) ! N. Nigeria : Jebba ! Bauchi Plateau, Naraguta (Aug.) ! Vom, 3,000–4,500 ft. ! Exsicc.—*Barter* (no number). *Lely* 519. *Dent Young* (no number). *Chev.* 22090 ; 22157 ; 22365.

3. **I. Barteri** *Skan*—F.T.A. 4, 3 : 350 ; Chev. Bot. 473. *I. gracilis* A. Chev. Bot. 474, partly, not of Skan. A slender erect branched herb like the last, often in tufts on mossy rocks, with blue or whitish flowers.

French Sudan : Koulikoro (Oct.) ! Mossi, Mt. Zongapignié, near Zorgo (July) ! French Guinea : Futa-Jallon, Dalaba-Diaguissa Plateau ! Timbo to Ditinn ! N. Nigeria : Jebba ! Zungeru (Sept.) ! Bauchi Plateau, Naraguta (Aug.) ! Pella, Yola Prov. (Aug.) ! Also around Lake Chad, etc. Exsicc.—*Barter* (no number). *Dalz.* 129 ; 166. *Lely* 520. *Chev.* 18421 ; 18762.

## 25. VERONICA Linn.—F.T.A. 4, 2 : 356.

Leaves petiolate, ovate, rounded and very shortly cuneate at the base, 2–4 cm. long, 1–2 cm. broad, shortly pubescent on both surfaces, serrate except towards the base ; petiole about 1 cm. long ; flowers paired on a slender axillary peduncle ; calyx-lobes elliptic, 3·5 mm. long, pubescent ; corolla 8–10 mm. long ; fruit bilobed, pilose 1. *abyssinica*

Leaves sessile, lanceolate, about 2·5 cm. long, serrulate, setulose-pubescent ; flowers in a dense terminal spike-like raceme ; calyx densely pilose ; corolla about 1·4 cm. long 2. *Mannii*

Leaves sessile ; flowers in axillary racemes .. .. .. .. .. 3. *Anagallis*

1. **V. abyssinica** *Fresen.*—F.T.A. 4, 2 : 358. Prostrate herb, creeping, branched from the base, more or less pilose, with blue or pinkish flowers ¼ in. across.

Cameroons Mt., 5,000–7,000 ft. or higher, in openings in the upper part of the forest and in the grasslands

(Dec., Jan.) ! Also in the highlands of E. Africa from Abyssinia to Nyasaland. Exsicc.—*Mann* 1263 ; 1997. *Johnston* 15. *Dunlap* 75.

2. **V. Mannii** *Hook. f.*—F.T.A. 4, 2 : 359. Stems glandular-pubescent, creeping and rooting from a hard perennial base, ascending or erect 6–12 in. high, with crowded leaves, and blue flowers.

Cameroons Mt., grasslands, 9,000 ft. up to the summit (Dec., Jan.) ! Fernando Po, summit of Clarence Peak (Dec.) ! Exsicc.—*Mann* 604 ; 1312 ; 2030. *Johnston* 52. *Dalz.* 8310. *Mildbraed* 10848 ; 10906.

3. **V. Anagallis** *Linn.*—F.T.A. 4, 2 : 357 ; Chev. Bot. 474. Herb, erect 1 ft. or more, from a creeping and rooting stem, with pale blue flowers.

French Sudan : Oasis of Bilma (May) ! Widely distributed in warm and temperate regions. Exsicc.—*Ducellier* ex *Herb.* *Chev.* 474.

## 138. OROBANCHACEAE

Herbs, parasitic on roots, often covered with scales at the base, never green ; stems with alternate, often crowded, scales. Flowers solitary in the axils of bracts, often crowded, hermaphrodite, zygomorphic. Calyx 4–5-toothed or lobed or variously split, lobes open or valvate. Corolla gamopetalous, often curved ; limb oblique or 2-lipped, lobes 5, imbricate, the adaxial 2 interior. Stamens 4, didynamous, inserted below the middle of the corolla-tube, alternate with the lobes, the fifth (adaxial) one reduced to a staminode or absent ; anthers often connivent in pairs, opening lengthwise. Ovary superior, 1-celled, with 4 parietal placentas ; style terminal ; ovules numerous. Capsule often enveloped by the calyx, opening by 2 valves. Seeds very numerous, small, with fleshy endosperm and minute embryo.

A small family recognised by the parasitic habit, absence of leaves, and the zygomorphic flowers usually crowded into spikes.

### **CISTANCHE** Hoffm. & Link.—F.T.A. 4, 2 : 463.

Calyx tubular-campanulate, 4–5-lobed ; corolla curved, 5-lobed ; stamens 4, didynamous, inserted low down in the corolla-tube ; anthers bearded ; ovary 1-celled, with 4 placentas ; capsule 2-valved.

A parasite, destitute of chlorophyll ; stem stout, fleshy, glabrous ; leaves reduced to fleshy scales, lurid-purple or yellowish, lower crowded, triangular, caudate-acuminate to acute, upper lanceolate, 1–2·5 cm. long, with thinner margins ; spikes up to 30 cm. long, dense ; bracts like the leaf-scales ; calyx 5-lobed to about the middle ; corolla-tube 2·5–5 cm. long, at length curved, wider in the upper half, villous in the lower part ; lobes broader than long ; anthers woolly .. .. .. .. *Phelipaea*

C. **Phelipaea** *Cout.* Fl. Port. 571. *Lathraea Phelipaea* Linn. *Cistanche lutea* Hoffm. & Link.—F.T.A. 4, 2 : 463 ; Chev. Bot. 480. Stem ½–1½ ft. high, swollen to 1 in. or more in diameter at the base, with bright yellow flowers.

Mauritania : Port Etienne, etc., half-buried in the sand (Feb.–Mar.) ! French Sudan : Goundam, parasitic on *Salvadora persica* (Aug.) ! 50 miles west of Tamrasset (Mar.) ! Senegal : Dakar, Cape Verde, St. Louis, etc., parasitic on plants of the sea-shore ! Extends through the Sudan to the Red Sea and Somaliland ; also in N. Africa to India, and in S. Europe. Exsicc.—*Roger.* *Sieber.* *Chev.* 3316 ; 3317. *Chipp* 115.

## 139. LENTIBULARIACEAE

Mostly perennial herbs, terrestrial, epiphytic or aquatic, often with much modified parts for the capture of small organisms. Leaves entire or much divided, often producing bladders. Inflorescence racemose, bracteate, those of some aquatic species supported on the water by a whorl of modified spongy leaves (floats). Flowers zygomorphic. Sepals 2 or 5. Corolla 2-lipped, spurred or saccate. Stamens 2, attached to the base of the corolla, filaments often winged on the outer side ; anthers 2-celled, dorsifixed, the cells sometimes confluent. Ovary superior, style very short, persistent ; stigma 2-lipped. Ovules numerous on a free-central placenta. Fruit a capsule, usually globose, opening by two valves or irregularly. Seeds without endosperm.

A small and very remarkable family of great morphological interest. Habitat usually aquatic or damp places ; flowers small to fairly large and showy, resembling those of small orchids.

Sepals 2, free to or near the base ; utricles (when present) bladder-like, ovoid or globose 1. **Utricularia**

Sepals 5 ; utricles tubular, with 2 spirally twisted arms .. .. .. 2. **Genlisea**

### 1. UTRICULARIA Linn.—F.T.A. 4, 2 : 469.[1]

*Terrestrial or epiphytic herbs with entire leaves or apparently leafless or nearly so :

Bracts not produced below the point of attachment :

Stems straight or flexuous (not twining) :

Stems with two or more basal leaves or apparently leafless at flowering time :

Sepals papillous-scabrid outside ; stems about 6 cm. long bearing 1–3 flowers ; corolla about 6 mm. long, spur subacute .. .. .. .. 1. *papillosa*

Sepals glabrous outside :

Stems about 15 cm. long or more, bearing several (6 or more) subsessile flowers ; sepals striate-nervose, elliptic ; leaves spathulate, mostly nearly all decayed at flowering time ; corolla 3–3·5 mm. long, spur acute .. .. 2. *firmula*

Stems 6–8 cm. long, bearing 1–3 pale-mauve flowers ; corolla about 6 mm. long, spur nearly straight, longer than the lower lip .. .. 3. *tribracteata*

Stems about 10 cm. long, bearing about 3 nearly sessile yellow flowers, corolla about 1·2 cm. long, the spur longer than the lip and very acute 4. *prehensilis*

Stems with a solitary leaf at the base, arising from a tuber ; leaf narrowly spathulate-oblanceolate, about 5 cm. long, including the long slender petiole ; flowers 1–2 ; corolla not seen .. .. .. .. .. .. .. .. 5. *Mannii*

Stems twining :

Lower lip of corolla about half as long as the spur or more ; flowers mauve-blue, several ; pedicels 5–7 mm. long ; spur very acute .. .. .. 6. *spiralis*

Lower lip of corolla less than a third as long as the spur, flowers yellow, 4–7 on each scape, fairly long-pedicellate ; spur broad and obtuse ; pedicels winged in fruit 7. *micropetala*

Lower lip of corolla a little shorter than the very acute spur ; flowers yellow ; subsessile ; pedicels not winged in fruit .. .. .. .. 4. *prehensilis*

Bracts produced below the point of attachment :

Leaves linear-lanceolate ; stems very slender, filiform, the flowering part markedly zigzag ; flowers yellow ; pedicels filiform, up to 6 mm. long ; corolla 5 mm. long, spur broad and subacute, 4–5 mm. long .. .. .. .. .. 8. *subulata*

Leaves orbicular-spathulate ; stems very short and not zigzag ; flowers white or rose, with a yellow spot on the lip ; corolla 5 mm. long, spur markedly curved, very narrow, acute, as long as the lip .. .. .. .. .. .. 9. *striatula*

**Aquatic herbs floating in water or creeping on mud :

Inflorescence not provided with a whorl of floats at the base :

Plants floating or creeping on mud (not attached by rhizoids) :

Scapes without a whorl of stolons at the base ; pedicels nodding in fruit :

Scapes many-flowered ; flowers yellow ; pedicels 1–1·5 cm. long, subreflexed in fruit ; bladders very numerous and small .. .. .. .. 10. *foliosa*

Scapes 1–2-flowered ; flowers yellow :

Leaves 1–2 cm. long ; seeds broadly winged ; bladders rather large, about 6 mm. long ; corolla about 1 cm. long, spur short, very obtuse .. 11. *platyptera*

Leaves up to 1 cm. long, hispidulous all over ; seeds narrowly winged ; bladders very small, 2–3 mm. long ; corolla 6 mm. long, spur very obtuse and short 12. *charoidea*

Scapes with a whorl of stolons at the base, 1–4-flowered ; fruiting pedicels straight ; corolla 5–6 mm. long ; bladders numerous, up to 8 on a leaf, usually from the forks of the leaf-division, about 2 mm. long .. .. .. .. 13. *exoleta*

Plants attached by adhesive claw-like rhizoids ; racemes many-flowered, flowers all to one side of the axis ; pedicels up to 4 mm. long ; corolla 2·5 mm. long, spur very small ; no bladders .. .. .. .. .. .. .. .. 14. *rigida*

Inflorescence provided at or towards the base with a whorl of floats ; leaves auriculate :

Upper corolla-lip entire :

Leaf-auricles large, hyaline, denticulate or more or less divided into hyaline segments ; capsule quite enveloped by the much-enlarged closed and cuneately decurrent calyx :

Corolla 6–7 mm. long ; leaf-auricles denticulate .. .. 15. *Thonningii*

Corolla 4–5 mm. long ; leaf-auricles with numerous long narrow flexuous segments .. .. .. .. .. .. .. .. 16. *trichoschiza*

Leaf-auricles cut up into deeply and often repeatedly rather rigid and rigidly ciliate segments ; capsule more or less exposed ; calyx not decurrent on the pedicel ; corolla yellow, 4–5 mm. long ; spur 4 mm. long .. .. .. 17. *stellaris*

Upper corolla-lip bilobed to the middle ; stolons and leaf-rays finely villous ; corolla lilac, with a violet mark on the lip, 8–10 mm. long ; capsule globose, 2 mm. diam. ; float leaves 5–6 in a whorl, very at the base, 1·5 cm. long, finely divided at the apex and sometimes bearing bladders .. .. .. .. .. 18. *villosula*

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[1] Key to species adapted mainly from Stapf in Dyer F.T.A. 4, 2 : 471.

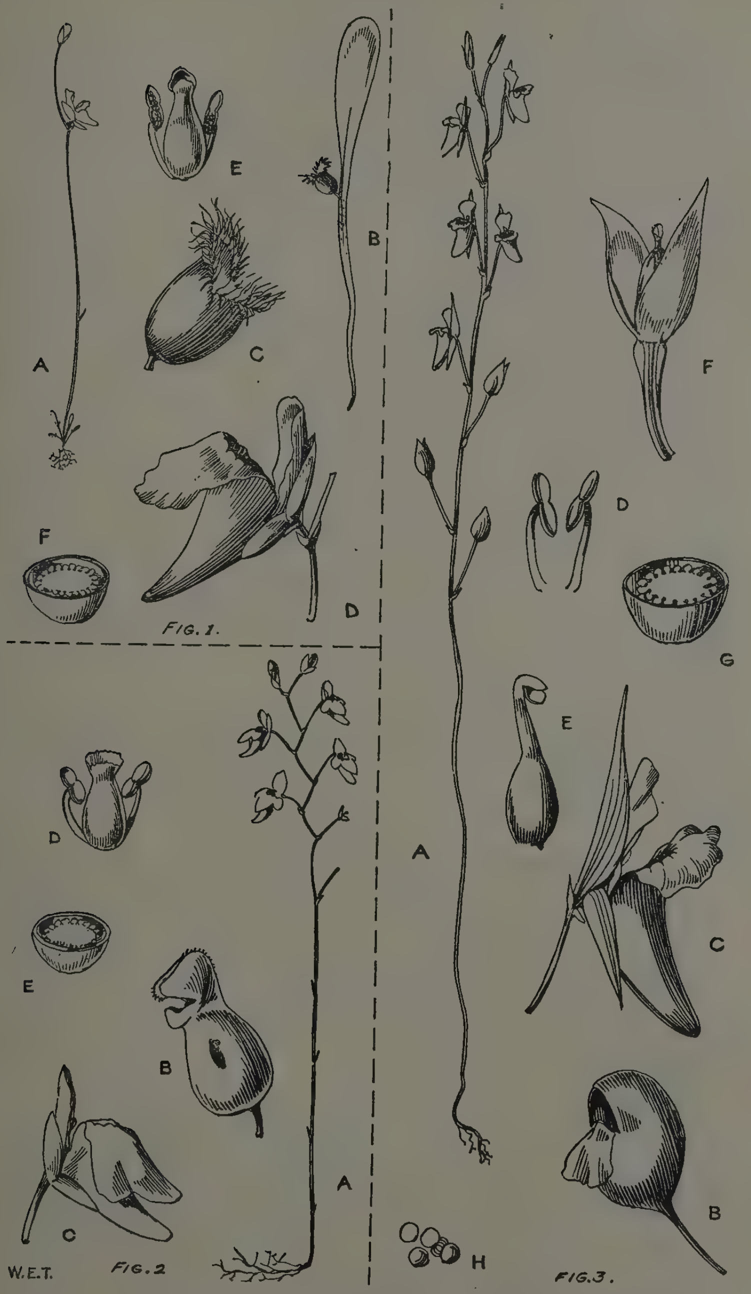

FIG. 257.

Fig. 1, UTRICULARIA TRIBRACTEATA *Hochst.* A, whole plant. B, leaf. C, bladder. D, flower. E. ovary and stamens. F, cross-section of ovary. Fig. 2, U. SUBULATA *Linn.* A, whole plant. B, bladder. C, flower. D, stamens and pistil. E, cross-section of ovary. Fig. 3, U. MICROPETALA *Smith.* A, whole plant. B, bladder. C, flower. D, stamens. E, pistil. F, fruit and calyx. G, cross-section of fruit. H, seeds.

1. **Utricularia papillosa** *Stapf* in Kew Bull. 1916 : 41. Very slender erect 1½–4 in. high (leafless in the specimens found) with small blue-purple flowers.

N. Nigeria : Abinsi, in bush pools (Nov.) ! Exsicc.—*Dalz.* 731 ; 732.

2. **U. firmula** *Welw.*—F.T.A. 4, 2 : 479 ; Chev. Bot. 481. Delicate terrestrial erect herb up to 9 in. high, with small yellow flowers with orange palate.

Senegal : Casamance, Koulayé (Feb.) ! Gambia : Kombo, in rice-fields ! French Guinea : Grandes Chutes (Dec.) ! Sierra Leone : Waterloo, in grass (Oct.) ! Ivory Coast : Mankono, near Nandala (June) ! N. Nigeria : Kontagora, in a marsh (Dec.) ! Also in E. Africa, south to Zambesi, and in Angola. Exsicc.—*Dalz.* 147. *Lane-Poole* 404. *Dawe* 24. *Chev.* 21865.

3. **U. tribracteata** *Hochst.*—F.T.A. 4, 2 : 475. Slender erect 1–3 in. high, with small blue-purple flowers.

N. Nigeria : Lokoja (Nov.) ! Yola (Sept.) ! Bauchi Plateau, Naraguta (Aug.) ! Vom, 3,000–4,500 ft. ! Also in Abyssinia and Transvaal. Exsicc.—*Dalz.* 133 ; 134. *Lely* 521. *Dent Young* 188.

4. **U. prehensilis** *E. Meyer*—F.T.A. 4, 2 : 480 ; Chev. Bot. 482. Erect, flexuous, becoming twining if long, with yellow flowers ½–⅓ in. long.

Ivory Coast : Mankono, Maraoué Valley (June) ! Also in Angola, E. Africa, Eastern South Africa and Madagascar. Exsicc.—*Chev.* 21888.

5. **U. Mannii** *Oliv.*—F.T.A. 4, 2 : 484. Slender erect 3–4 in. high from a small tuber.

Cameroons Mt., 4,000–6,000 ft. (Nov.) ! Exsicc.—*Mann* 2112.

6. **U. spiralis** *Smith*—F.T.A. 4, 2 : 482 ; Chev. Bot. 483. *U. baoulensis* A. Chev. *U. Baumii* var. *leptocheilos* Pelleg.—Chev. Bot. 481. A slender twiner on grass, etc., in wet places, with blue-purple flowers varying in size from ¼ to nearly 1 in. long.

Senegal : Casamance, Samanding (Feb.) ! French Guinea : Kindia ! Grandes Chutes ! Sierra Leone : various localities ! Ivory Coast : Baoulé-Nord, Nzi Valley, between Alangouassou and Mbayakro (Aug.) ! N. Nigeria : Kontagora (Nov.) ! S. Nigeria : Lagos ! Exsicc.—*Barter* 2214. *Sc. Elliot* 4342. *Farmar* 201. *Smythe* 6. *Dalz.* 144 ; 1026 ; 1027. *N. W. Thomas* 3095. *Deighton* 1304. *Glanville* 26. *Chev.* 20298. *Dalz.* 1027, and *Glanville* 26 appear to be a large-flowered form.

7. **U. micropetala** *Smith*—F.T.A. 4, 2 : 483 ; Chev. Bot. 482. Stems very slender sometimes erect at first, later twining on grass, etc., with bright yellow flowers ½ in. long.

French Sudan : Sikasso (May) ! French Guinea : Kindia, in a swamp ! Futa-Jallon, between Timbo and Ditinn (Sept.) ! Diaguissa, 3,600 ft. (Oct.) ! Sierra Leone : Waterloo (Oct.) ! N. Nigeria : Kontagora, Odara Marsh (Nov.) ! Bauchi Plateau, Naraguta (Aug.) ! Vom, 3,000–4,500 ft. ! Exsicc.—*Afzelius*. *Farmar* 199. *Dalz.* 145. *Lane-Poole* 405. *Lely* 553. *Dent Young* 187.

8. **U. subulata** *Linn.*—F.T.A. 4, 2 : 485 ; Chev. Bot. 484. Stems very slender erect flexuous 3–4 in. high, with small yellow flowers.

French Sudan : Sikasso in wet mud (May) ! French Guinea : Futa-Jallon, Timbo to Ditinn (Sept.) ! Diaguissa, 3,650 ft. (Oct.) ! Sierra Leone : several localities ! Liberia : Grand Bassa. Ivory Coast : Mankono (June) ! N. Nigeria : Kontagora (Dec.) ! Bauchi Plateau, Naraguta (Aug.) ! S. Nigeria : Lagos ! Throughout tropical Africa, and also tropical America. Exsicc.—*Barter* 2213. *H. H. Johnston* 18. *Dalz.* 146. *Lane-Poole* 402. *N. W. Thomas* 2966. *Burbridge* 489. *Deighton* 1442. *Lely* 522.

9. **U. striatula** *Smith*—F.T.A. 4, 2 : 486 ; Chev. Bot. 483. *U. peltatifolia* A. Chev. & Pellegr., Chev. Bot. 482. Delicate erect 2–3 in. high, with white or pink flowers ; habitat on wet rocks, etc.

French Guinea : Futa-Jallon, Diaguissa (Oct.) ! Ditinn to Timbo (Sept.) ! Dalaba (Oct.) ! Sierra Leone : Regent (Aug., Dec.) ! N. Prov., Bumban (Aug.) ! Ivory Coast : Mankono (June) ! N. Nigeria : Bauchi Plateau, Vom, 3,000–4,500 ft. ! Cameroons Mt., 5,000 ft. (Nov.) ! Extends through Ubangi Shari to E. Africa ; and in India and Malaya. Exsicc.—*Afzelius*. *Mann* 1964. *Sc. Elliot* 3965. *Deighton* 1307 ; 2071. *Dent Young* 189. *Chev.* 18414 ; 18416 ; 20207 ; 21918.

10. **U. foliosa** *Linn.*—F.T.A. 4, 2 : 491. Aquatic plant in masses in slow-running water with erect racemes up to 1 ft. long with yellow flowers ⅓–⅔ in. long.

Sierra Leone : Sembihun (Dec.) ! Also in Abyssinia and Angola, extending to Natal and Madagascar, and in tropical America. Exsicc.—*Deighton* 301.

11. **U. platyptera** *Stapf*—F.T.A. 4, 2 : 492 ; Chev. Bot. 482. *U. pilifera* A. Chev. Aquatic plant in masses with short lateral scapes of yellow flowers the pedicels lengthening and recurving in fruit.

Ivory Coast : Mankono (June) ! Baoulé-Nord, Nzi Valley, between Mbyakro and Korakissikro (Aug.) ! N. Nigeria : Nupe ! Kontagora, Zungeru, etc., common (Dec.) ! S. Nigeria : Sapoba ! Exsicc.—*Barter* 890. *Dalz.* 143. *Kennedy* 278. *Chev.* 22297.

12. **U. charoidea** *Stapf*—F.T.A. 4, 2 : 493. Aquatic rather hairy herb, with small yellow flowers solitary on a short lateral pedicel.

N. Nigeria : Lokoja or neighbourhood ! Exsicc.—*Barter* (no number).

13. **U. exoleta** *R.Br.*—F.T.A. 4, 2 : 495 ; Chev. Bot. 481. Floating or creeping on wet mud, with yellow flowers nearly ¼ in. long, 1–3 on a slender raceme 2–3 in. long.

French Sudan : Ianfola (Mar.) ! Senegal : Casamance, Koulaye (Feb.) ! Sierra Leone : Limba, Makunde (Apr.) ! N. Nigeria : Zungeru (Sept.) ! Yola (Jan.) ! S. Nigeria : Lagos, Ikoyi (Oct.) ! Throughout tropical Africa ; also S. Africa, Algiers, Portugal, and India to China and Australia. Exsicc.—*Barter* 2212. *Sc. Elliot* 5718. *Dalz.* 131 ; 141 ; 1234.

14. **U. rigida** *Benjamin*—F.T.A. 4, 2 : 486 ; Chev. Bot. 483. Aquatic herb attached to rocks with submerged or floating flexible stems a few inches long, and small white (sometimes blue) flowers on scapes 2–8 or more inches long emerging.

French Sudan : Sikasso (May) ! Koulikoro (Oct.) ! Senegal ! French Guinea : Futa-Jallon, several localities ! Kouria and district ! Sierra Leone : Sugar Loaf Mt. ! Franziga, in a running stream (Dec.) ! Regent (Oct.) ! N. Prov., Bumban (Aug.) ! N. Nigeria : Bauchi Plateau, Naraguta (Aug.) ! Exsicc.—*Heudelot* 710. *Barter* (no number). *Sc. Elliot* 4736. *Lane-Poole* H. 2141–13. *Dawe* 404. *Deighton* 1302 ; 2188. *Lely* 555.

15. **U. Thonningii** *Schumach.*—F.T.A. 4, 2 : 487. Submerged and floating below the surface, with whorls of linear-oblong floats ¾–1 in. long, and flowers ¼–⅓ in. long, in erect racemes, yellow or whitish with purple lines, or purplish, the calyx much enlarged in fruit.

Gold Coast : Cape Coast ; Accra or vicinity. N. Nigeria : Nupe ! Yola (Jan.) ! Keana ! Extends to E. Sudan, Uganda and E. Africa. Exsicc.—*Barter* 1039. *Dalz.* 130 ; 132. *Hepburn* 50.

16. **U. trichoschiza** *Stapf*—F.T.A. 4, 2 : 488. Like the last, with oblong floats ½ in. long.

S. Nigeria : Lagos Colony ! Calabar R. (Feb.) ! Exsicc.—*Mann* 2326. *Millson*.

17. **U. stellaris** *Linn. f.*—F.T.A. 4, 2 : 489 ; Chev. Bot. 483. Submerged floating below the surface, with floats short and broad ⅓–½ in. long, and yellow flowers ¼ in. long in short or long erect racemes.

Fairly common from Senegal and French Sudan to Bornu ! Extends to E. Sudan, Uganda, E. and S. Tropical, and South Africa, Madagascar, India and Australia. Exsicc.—*Roger*. *Barter* 1553. *Sc. Elliot* 5360. *Elliott* 139. *Dalz.* 142. *N. W. Thomas* 5322. *Deighton* 2093.

18. **U. villosula** *Stapf*—F.T.A. 4, 2 : 490. Aquatic half-submerged with slender terminal racemes of bluish-purple and white flowers ⅓ in. long.

Sierra Leone : Ronietta, Roruks (Oct.) ! Songo (Oct.) ! Sherbro, Bonthe in swamps (Feb.) ! Sulima (Dec.) ! S. Nigeria : Sapoba ! Also in Angola. Exsicc.—*Dalz.* 1025. *Burbridge* 414. *Lane-Poole* 390. *Deighton* 288. *Kennedy* 279.

### *Imperfectly known species.*

**U. graniticola** *A. Chev.* Bot. 482, name only. Plant in moss-like tufts, with scapes up to 6 in. long, 3–4-flowered.

Ivory Coast : Upper Cavally, Dyola country, summit of Mt. Do, 2,800 ft. in moist soil on rocks (May) ! Upper Sassandra, summit of Mt. Dou, 4,025 ft. near Zoanlé (May) ! Exsicc.—*Chev.* 21441 ; 21497.

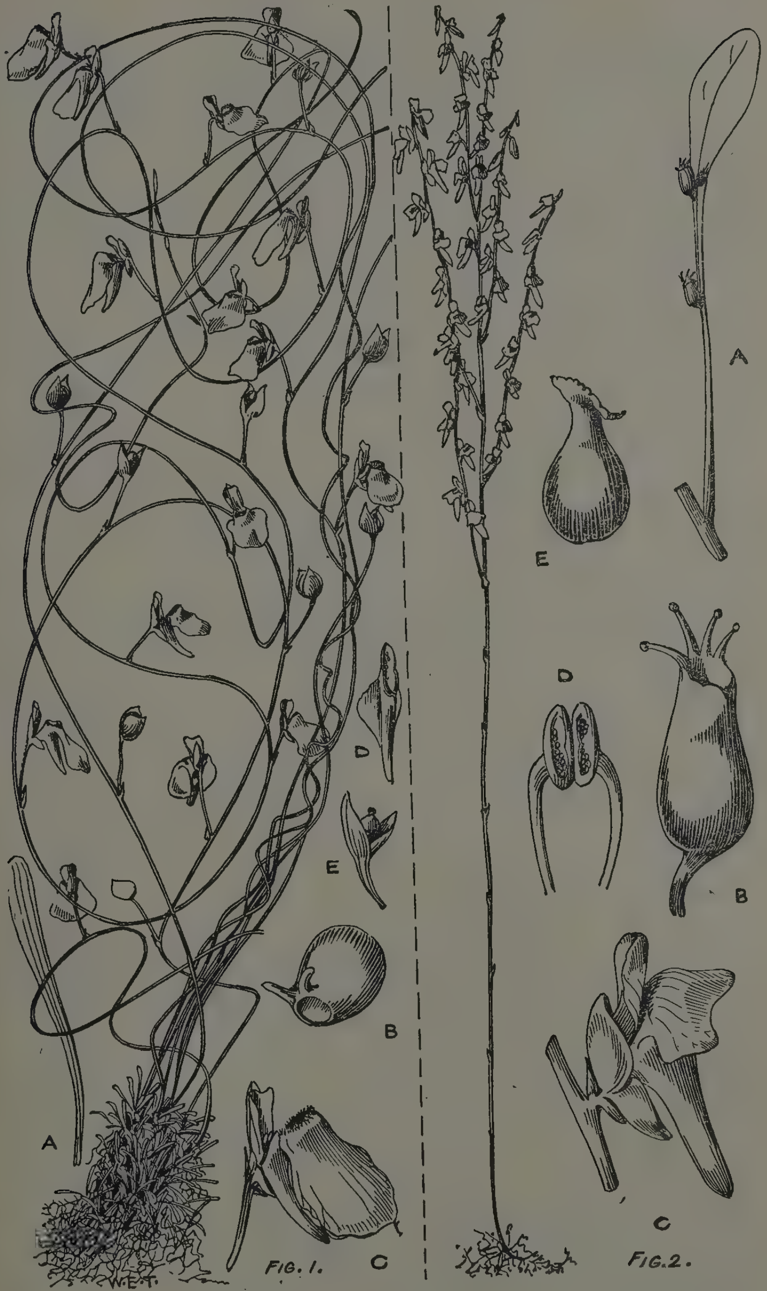
A
B
C
D
E
FIG. 1.
W.E.T.
A
B
C
D
E
FIG. 2.

Fig. 258.

Fig. 1, Utricularia spiralis *Smith*. A, leaf. B, bladder. C, flower. D, stamen. E, young fruit. Fig. 2, U. firmula *Welw.* A, leaf. B, bladder. C, flower. D, anthers. E, ovary.

### 2. **GENLISEA** St. Hil.—F.T.A. 4, 2 : 497.

A rootless terrestrial annual; leaves numerous in a basal rosette, spathulate, about 1 cm. long or smaller, glabrous; scape 3–6-flowered, racemose, glandular; bracts very small and ovate; pedicels up to 3·5 cm. long, glandular-pubescent; calyx-segments ovate-lanceolate, acute, 2 mm. long; corolla 1 cm. long, 2-lipped, spurred; upper lip ovate, lower lip 3-lobed; capsule globose, 4 mm. diam., glandular-puberulous *africana*

**G. africana** *Oliv.*—F.T.A. 4, 2 : 497; Chev. Bot. 484. *G. Stapfii* A. Chev. Bot. 484. Slender herb with erect scapes a few inches to 1 ft. high, with rhizoids but not true roots, and blue-purple flowers ⅓ in. long; in wet grassland.

French Guinea: Futa-Jallon, between Timbo and Ditinn (Sept.)! Sierra Leone: Waterloo (Aug., Oct.)! N. Prov., Bumban (Aug.)! Materboi (Oct.)! Ivory Coast: Upper Sassandra, Dyola country, summit of Mt. Dou, 4,050 ft. (May)! Also in Angola and Rhodesia. Exsicc.—*Lane-Poole* 403. *Deighton* 1303; 2055. *Glanville* 19. *Chev.* 18415; 21498; 21499.

## 140. GESNERIACEAE

Herbs, or rarely shrubs or trees. Leaves radical or opposite, equal or alternately large and small. Flowers hermaphrodite or cleistogamous, usually zygomorphic, often large and showy. Calyx free to adnate to the ovary; lobes valvate or rarely imbricate. Corolla with an oblique limb, often 2-lipped, lobes imbricate, the adaxial pair often interior. Stamens 4 or 2; anthers connate or connivent or free, 2-celled, opening lengthwise. Disk present. Ovary superior to inferior, 1-celled with 2 parietal sometimes intrusive placentas. Ovules numerous. Fruit a capsule (often spirally twisted) or berry. Seeds numerous, small.

Mainly in the tropics and subtropics, often favouring shady places and sometimes epiphytic; comparatively very few in Africa.

Capsule linear:
  Capsule-valves remaining flat after opening; flowers subsolitary .. 1. **Didymocarpus**
  Capsule-valves twisting spirally after opening; flowers cymose-paniculate 2. **Streptocarpus**
Capsule ovoid or oblong:
  Flowers in an open cyme; leaf solitary, basal, sessile .. .. 3. **Acanthonema**
  Flowers in a small head .. .. .. .. .. .. 4. **Epithema**

### 1. **DIDYMOCARPUS** Wall.—F.T.A. 5 : 503.

Stems prostrate and rooting at and between the nodes, glabrous; leaves ovate, rounded at the base, subobtuse, 4–6 cm. long, 3–4 cm. broad, glabrous, with about 6 pairs of lateral nerves; petiole 2·5–3·5 cm. long, nearly glabrous; flowers subsolitary; pedicels 1 cm. long; calyx-segments linear, 8 mm. long, slightly pilose; corolla urceolate, 8 mm. long, lobes very short, acute; fruit linear .. *kamerunensis*

**D. kamerunensis** *Engl.* Bot. Jahrb. 18 : 79, tt. 4–5.—F.T.A. 5 : 503. A weak branched herb 1 ft. or more long, with yellow axillary flowers.

S. Nigeria: Barombi! Exsicc.—*Preuss* 951.

### 2. **STREPTOCARPUS** Lindl.—F.T.A. 5 : 504.

Ovary glabrous or nearly so; ripe capsule glabrous, 4–5 cm. long; branchlets hispid with gland-tipped hairs; lower leaves very long-petiolate, upper sessile, ovate-elliptic, acuminate, rounded or subcordate at the base, 8–12 cm. long, 4–6 cm. broad, setulose above, nearly glabrous below; corolla 1 cm. long .. .. 1. *elongatus*
Ovary and ripe capsule pubescent; corolla 2·5 cm. long or more:
  Corolla pale, 3 cm. long, pubescent towards the constricted base; leaves oblong- or ovate-elliptic, rounded at the base, 4–8 cm. long, 3–4·5 cm. broad, crenulate, setulose above, thinly pubescent below; petiole up to 2 cm. long; capsule 5 cm. long, shortly pubescent (not glandular) .. .. .. .. .. .. 2. *balsaminoides*
  Corolla deep-purple, 3–3·5 cm. long, the tube glandular-pubescent outside; leaves ovate-elliptic, rounded to subcordate at the base, shortly and obtusely pointed, up to 12 cm. long and 7 cm. broad, pubescent to nearly glabrous on both surfaces; lower flowers small and cleistogamous, the tiny corolla narrowly hood-like and persistent on the young fruit; capsule at most 5 cm. long .. .. 3. *nobilis*
  Corolla, etc., as above, but capsule 12 cm. long, glandular-pubescent .. 4. *insularis*

1. **Streptocarpus elongatus** *Engl.* Bot. Jahrb. 18 : 76, tt. 4–5, fig. A.—F.T.A. 4, 2 : 509. Erect herbaceous 1–1½ ft. high, with white flowers in lax pedunculate cymes and narrow capsules 2 in. long.
   Cameroons Mt.: Buea! Exsicc.—*Preuss* 1010.
2. **S. balsaminoides** *Engl.* Bot. Jahrb. 18 : 77, tt. 4–5, fig. E.—F.T.A. 4, 2 : 509, incl. var. *tenuifolia* Engl. Stems 1–2 ft., fairly stout, with pale bluish-purple flowers 1–1¼ in. long.
   S. Nigeria: Barombi! Johann-Albrechtshöhe! Exsicc.—*Preuss* 539. *Staudt* 456.

3. **S. nobilis** *C.B.Cl.*—F.T.A. 4, 2 : 511. *S. lagosensis* C.B.Cl. *S. atroviolaceus* Engl. *S. princeps* Mildbr. & Engl. *S. violascens* Engl. (?) (fruiting spec. only seen). Stems up to 3 ft. high, half-succulent, with deep violet-purple flowers 1–1½ in. long.

Senegal : Landouman country, amongst rocks by a stream ! Gold Coast : S. Ashanti, Adiambra to Domiabra (June) ! Togo : Misahöhe (Nov.) ! N. Nigeria : Lokoja, ravines of Patti (Oct.) ! Mada Hills, 2,000–3,000 ft. ! S. Nigeria : Lagos Colony ! Cameroons Mt., Victoria (Oct.) ! Likomba (Oct., fr. Nov.) ! Exsicc.—*Heudelot* 728. *Dalz.* 121. *Kitson* 1231. *Hepburn* 80. *Maitland* 743. *Mildbr.* 7329 ; 10509 ; 10619.

4. **S. insularis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *S. denticulatus* Engl. Bot. Jahrb. 57 : 213, not of Turrill. A handsome plant about 3 ft. high, with dark violet-blue flowers.

Fernando Po, mountain meadows at Moka, 4,000–5,500 ft. (Nov.) ! Exsicc.—*Mildbr.* 7113.

*Imperfectly known species.*

**S. Kerstingii** *Engl.* Bot. Jahrb. 57 : 209. Specimen in fruit and leaf only.

Togo : Sokode-Basari (fr. Nov.) ! Exsicc. *Kersting* 501 (22).

### 3. ACANTHONEMA Hook. f.—F.T.A. 5 : 502.

Stems short, tomentose, bearing one leaf and a short cyme ; leaf ovate-oblong, cordate at the base, up to 20 cm. long and 10 cm. broad, with numerous lateral nerves, setulose-pilose above and on the nerves below ; cymes several-flowered ; pedicels 1 cm. long ; calyx-segments lanceolate, 5 mm. long, pilose ; corolla slightly curved, 2 cm. long ; fruit ovoid, sharply beaked, 6 mm. long, glabrous .. .. *strigosum*

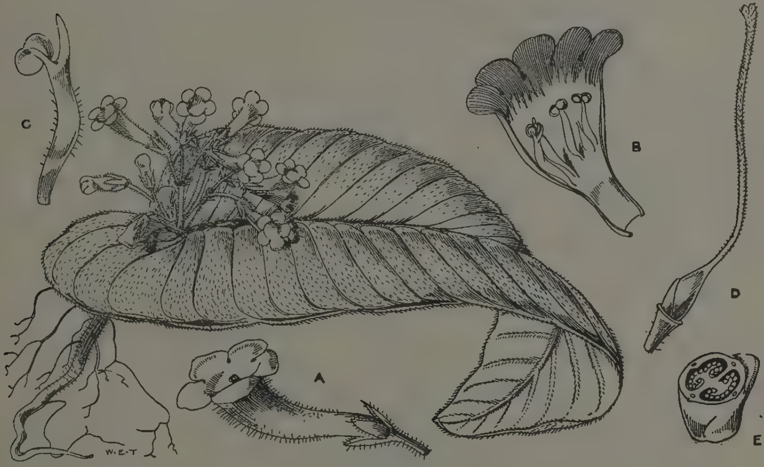

FIG. 259.—ACANTHONEMA STRIGOSUM *Hook. f.* (GESNERIACEAE).

A, flower. B, corolla laid open. C, stamen. D, pistil. E, cross-section of ovary.

**A. strigosum** *Hook. f.* Bot. Mag. t. 5339—F.T.A. 5 : 502. Flowers bluish-purple ¾ in. long in short cymes borne 1–4 together at the base of the leaf ; epiphytic or on rocks, etc.

Cameroons Mt., 2,000 ft. (Dec.) ! Fernando Po, 1,000–2,000 ft. (Nov.) ! Also in French Cameroons. Exsicc.—*Mann* 569 ; 1948.

### 4. EPITHEMA Blume—F.T.A. 5 : 501.

Nearly stemless herb ; leaves ovate-elliptic, cordate at the base, up to 12 cm. long and 3–8 cm. broad, thinly pilose on both surfaces, serrulate ; petiole 2–2·5 cm. long, pilose ; mature flowers not seen .. .. .. .. .. .. *tenue*

**E. tenue** *C.B.Cl.*—F.T.A. 4, 2 : 502. *E. graniticolum* A. Chev. Bot. 484. Somewhat succulent, with a single leaf at flowering ; calyx hirsute-velvety.

French Guinea : Guerzé country, Boola Mt., 3,200 ft. (Mar.) ! Ivory Coast : Upper Cavally, Dyola country, Do Mt., 2,900 ft., on rocks in forest (May) ! Upper Sassandra, between Droupleu and Zoanlé (May) ! Between Digoualé and Gouané (May) ! Upper Nuon, Sampleu to Ganhouie. Fernando Po ! Exsicc.—*Mann* 2345. *Chev.* 20924 ; 21141 ; 21418 ; 21457 ; 21506.

## 141. BIGNONIACEAE

Trees or shrubs, sometimes scandent, very rarely herbs. Leaves opposite, rarely alternate, mostly compound, digitate or pinnate, sometimes the terminal leaflet tendril-like ; stipules absent. Flowers often showy, hermaphrodite, more or less zygomorphic. Calyx campanulate, closed or open in bud, truncate or 5-toothed. Corolla with 5 imbricate lobes sometimes forming 2 lips, the upper of 2, the lower of 3 lobes. Stamens alternate with the corolla-lobes, only 4 or 2 perfect. Anthers connivent in pairs or rarely free, 2-celled, opening lengthwise; staminode representing the fifth stamen often short, sometimes absent, often 3 present when only two stamens. Disk usually present. Ovary superior, 2-celled with 2 placentas in each cell or 1-celled with parietal bifid placentas. Style terminal, 2-lipped; ovules numerous. Fruit capsular or fleshy and indehiscent. Seeds often winged, without endosperm; embryo straight.

Calyx not spathaceous:

Ovary 1-celled; fruit indehiscent, sausage-shaped; seeds not winged .. 1. **Kigelia**

Ovary 2-celled; fruit dehiscent; seeds winged .. .. .. 2. **Stereospermum**

Calyx spathaceous:

Calyx split on the adaxial side; ovules in 4 or more series:

Ovules in many series; valves of the fruit boat-shaped; calyx recurved, acuminate, ribbed .. .. .. .. .. .. .. .. 3. **Spathodea**

Ovules in 4–6 series; valves of the fruit flat; calyx beaked in bud 4. **Markhamia**

Calyx split on the abaxial side, bilobed at the apex; ovules in 2 series 5. **Newbouldia**

## 1. KIGELIA DC.—F.T.A. 5 : 533.

Leaflets scabrid on the upper surface, pubescent below and on the leaf-rhachis:

Leaflets sessile or subsessile, 4 pairs, rounded or slightly pointed at the apex, unequal-sided at the base, 6–12 cm. long, 3–5 cm. broad, with 5–6 pairs of lateral nerves; panicle lax; lateral branchlets of the panicle usually 3-flowered; pedicels up to 3 cm. long; calyx subregular, 2·5 cm. long, glabrous; corolla about 10 cm. long; stigma broadly obovate, toothed; anthers 1 cm. long 1. *aethiopica* var. *bornuensis*

Leaflets stalked, acuminate, 6 pairs, broadly elliptic, rounded and slightly unequal-sided at the base, with about 8 pairs of lateral nerves arcuate-spreading; calyx scarcely 2 cm. long, subregular; corolla about 5 cm. long .. .. 2. *Talbotii*

Leaflets not scabrid above, glabrous below and on the leaf-rhachis:

Leaflets rounded at the apex or obscurely apiculate, 3–4 pairs, with arcuate-spreading nerves, entire or very rarely irregularly dentate near the apex, sessile or subsessile, very unequal-sided at the base, up to 12 cm. long and 6 cm. broad; panicle lax; pedicels up to 5 cm. long; calyx 2·5 cm. long, subregular; corolla 6–7 cm. long; anthers 1 cm. long; stigma broadly ovate, denticulate .. .. .. 3. *africana*

Leaflets more or less acuminate, with the lateral nerves ascending at a fairly acute angle and more or less straight:

Leaflets toothed towards the apex, 5-pairs; stigma elliptic:

Leaflets somewhat rounded and very broadly and shortly cuneate at the base, oblong-elliptic, with very prominent lateral nerves and tertiary nerves, up to 17 cm. long and 7 cm. broad; calyx subregular, 3–4 cm. long; corolla 7 cm. long; anthers 8 mm. long; stigma broadly ovate, denticulate .. .. 4. *Elliotii*

Leaflets very acutely cuneate at the base, acutely long-acuminate, about 20 cm. long and 7 cm. broad, with about 10 pairs of lateral nerves, very thin; calyx 3 cm. long, subregular; corolla 7 cm. long; stigma ovate-elliptic; anthers 7 mm. long 5. *acutifolia*

Leaflets entire:

Stigma ovate; anthers 8–9 mm. long; leaflets oblong-elliptic to obovate, acutely acuminate, very shortly subcuneate at the base, 12–20 cm. long, 7–9 cm. broad, thin, with about 8 pairs of lateral nerves; calyx 3 cm. long; corolla 7 cm. long 6. *elliptica*

Stigma lanceolate; anthers 6 mm. long; leaflets stalked, broadly oblong-elliptic, rounded at the base, abruptly acuminate, 15–18 cm. long, 7–8 cm. broad, thin, with about 8 pairs of lateral nerves; calyx subregular, 1·5–2 cm. long; corolla 7 cm. long .. .. .. .. .. .. .. .. .. 7. *impressa*

1. **Kigelia aethiopica** var. **bornuensis** *Sprague*—F.T.A. 4, 2 : 538; Holl. 3 : 510. A tree up to 50 ft. high with imparipinnate leaves, large lurid red-purple flowers in long-peduncled pendulous panicles, and large sausage-shaped fruits.

Togo: Sokode (Mar.)! N. Nigeria: Bornu (Apr.)! Exsicc.—*E. Vogel* 83. *Kersting* 79. (See Appendix).

2. **K. Talbotii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined.

S. Nigeria: Oban! Exsicc.—*Talb.* 1354.

3. **K. africana** *Benth.*—F.T.A. 4, 2 : 536; Holl. 3 : 511; Chev. Bot. 487. *K. Elliotii* Sprague, partly. Habit of *K. aethiopica* (above); flowers dark red with yellow stripes; often planted in towns.

French Sudan: Arnassé, dunes by the river (July)! Timbuktu! Pont, by a marsh of the Mbaouan! Sompi, El Massara (Aug.)! Senegal! Gambia, south bank! Sierra Leone: Talla, near Kundita (Feb.)! Gold Coast: Cape Coast! N. Terr., White Volta R.! Togo: Kpedsu. N. Nigeria: Borgu, Wawa! Katagum (Aug.)! Bechi, Nupe! Bauchi Plateau (Mar.)! S. Nigeria: Yoruba, R. Ossin! Between Oyo and Ijaye! Oban! Cross R. Division, Adaha (Jan.)! Exsicc.—*Michelin.* *T. Vogel* 88. *Barter* 724; 1145; 3433. *Brown-Lester* 15. *Sc. Elliot* 5037. *Holl.* 237; 238. *Dalz.* 105. *Yates* 50. *Lely* P. 198. *Howes* 1088. *Kitson* 683, *Talb.* 1016. (See Appendix).

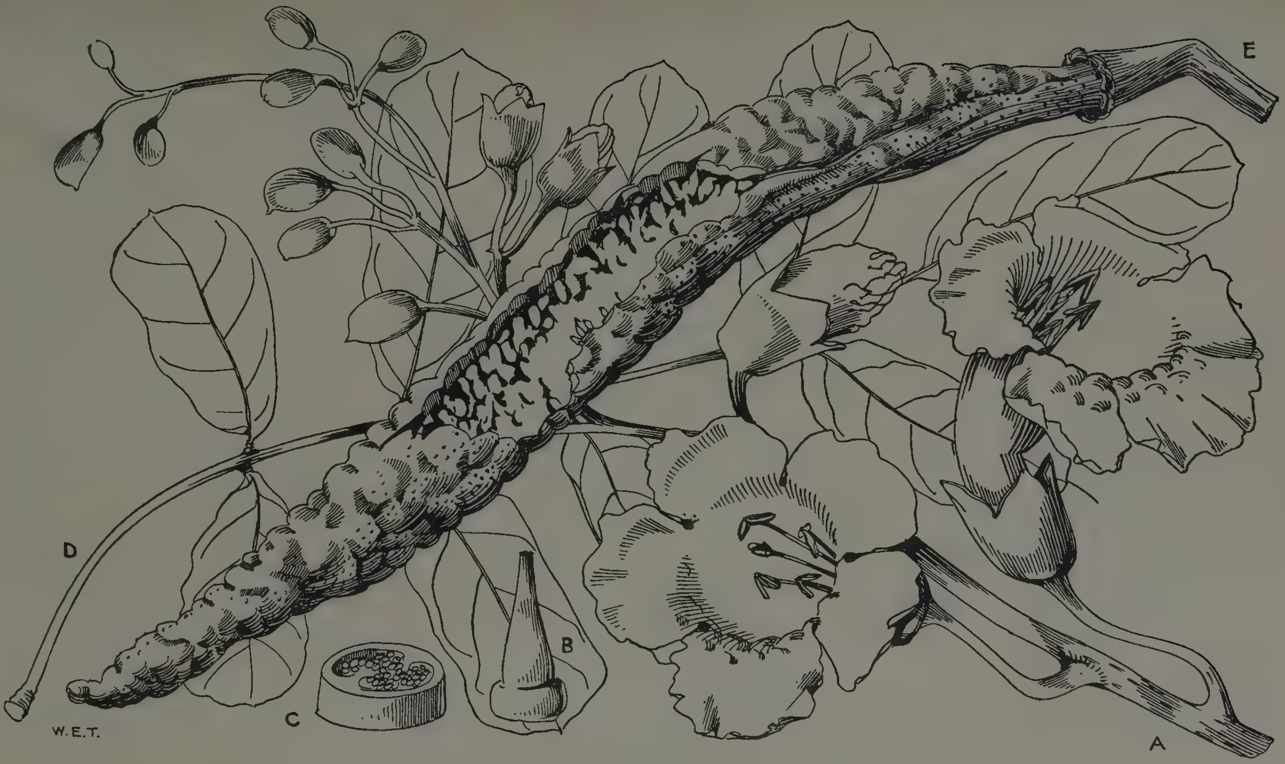

FIG. 260.—KIGELIA AFRICANA *Benth.* (BIGNONIACEAE).
A, flowers. B, ovary. C, cross-section of ovary. D, leaf. E, immature fruit (the mature fruit is turgid and sausage-shaped).

4. **K. Elliotii** *Sprague*—F.T.A. 4, 2 : 536, partly. A tree with dark red flowers and cylindrical pendulous fruits 10–16 in. long and 4–5 in. in diameter.
   Sierra Leone : Buyabuya, Scarcies (fr. Feb.) ! Freetown, Regent Road (Sept.) ! Kamalu (May) ! S. Kambui Reserve (Mar.) ! Exsicc.—*Sc. Elliot* 4757 (excluding flowers). *N. W. Thomas* 340. *Lane-Poole* 357. *Dawe* 437.
5. **K. acutifolia** *Engl.*—F.T.A. 4, 2 : 535. A tree 20–30 ft. high, with brown-red flowers and fruit 18 in. long.
   Sierra Leone : *Maybile* (Dec.) ! S. Nigeria : Oban ! Barombi (Mar.) ! Also in French Cameroons. Exsicc. —*Preuss* 202. *N. W. Thomas* 5928. *Talb.* 115.
6. **K. elliptica** *Sprague*—F.T.A. 4, 2 : 534. *K. Spragueana* Wernham. A forest tree 20–30 ft. high with dark red flowers and cylindrical fruits 18 in. long and 4 in. in diameter.
   S. Nigeria : Bonny ! Eket ! Cross River Division (fr. Apr.) ! Cameroons Mt., Mayuko (Feb.) ! Tiko (Feb.) ! Exsicc.—*Monteiro. McLeod. Dalz.* 8224. *Dunlap* 253. *Talb.* (no number).
7. **K. impressa** *Sprague*—F.T.A. 4, 2 : 535. *K. tristis* A. Chev. Bot. 487, partly. *K. Elliotii* A. Chev. Bot. 487, not of Sprague. A tree 20–25 ft. high with flowers yellow turning to dark red-purple and cylindrical fruits.
   French Guinea : Kouria (Oct.) ! Konkouré River bank, near Kouria (July) ! Ivory Coast : Middle Sassandra, Soubré (June) ! Bingerville and neighbourhood ! Bouroukrou (Dec.–Jan.) ! Fernando Po (Dec.) ! Exsicc.—*Barter* (no number). *Mann* 2. *Chev.* 14916 ; 14949 ; 15559 bis ; 16884 ; 19089.

## 2. **STEREOSPERMUM** Cham.—F.T.A. 5 : 517.

Calyx campanulate, 5–6 mm. long, softly tomentellous to nearly glabrous outside ; corolla about 5 cm. long, tube softly pubescent outside ; leaflets 3–4 pairs, stalked, oblong or oblong-elliptic, shortly acuminate, 5–10 cm. long, entire or crenate-serrate, glabrous or softly pubescent ; panicle large, usually softly pubescent ; capsule cylindric ; elongate, up to 60 cm. long ; seeds winged at each end, 2·5–3 cm. long 1. *Kunthianum*

Calyx tubular, 1·5–2 cm. long, glabrous outside ; corolla 5–6 cm. long, tube glabrous or very sparingly pubescent outside ; leaflets 5–6 pairs, oblong, long-acuminate, 8–14 cm. long, closely reticulate below, glabrous ; panicle glabrous except for the small bracts ; fruit as above .. .. .. .. .. .. .. 2. *acuminatissimum*

1. **S. Kunthianum** *Cham.*—F.T.A. 4, 2 : 518 ; Holl. 3 : 508 ; Chev. Bot. 487. A tree of savannah woodlands, up to 30–40 ft. high, with drooping ample panicles of pink or purplish and darker streaked flowers 1½–2 in. long ; flowering in the dry season usually white leafless.
   Senegal and French Sudan to N. Nigeria and savannah areas of Lagos Colony ! Extends to the Red Sea, and south to Nyasaland and Congo Basin. Exsicc.—*Heudelot* 202. *E. Vogel* 89. *Barter* 1135. *Rowland. Johnson* 537. *Elliott* 12. *Pobéguin* 180. *Baumann* 372. (See Appendix).
2. **S. acuminatissimum** *K. Schum.*—F.T.A. 4, 2 : 519 ; Chev. Bot. 486. *S. leonense* Sprague. A tall tree up to 100 or more ft. high, of forests, with pink or pale purple flowers 1½–2 in. long in ample corymbose-pyramidal panicles.
   French Guinea : Hola to Danane, fairly common (June) ! Sierra Leone : Wilberforce ! Kessewe (May) ! Panguma (June) ! Bumbuna ! Tonkoli Forest (June) ! Ivory Coast : Dyola country, summit of Mt. Goula, near Danané, 1,400–1,500 ft. (Apr.) ! Mt. Zan, summit, 2,450 ft. near Zagoué (May) ! Anoumaba, in forest (Nov.) ! Gold Coast : Kumasi (June) ! Abofaw (June) ! Kwahu Plateau (fr. May) ! S. Nigeria : Lagos Colony ! Benin district, Ubiaja (June) ! Shofang (Nov.) ! Imo River (Dec.) ! Victoria ! Also in French Cameroons. Exsicc.—*Phillips* 41. *Farquhar* 37 ; 190. *Unwin* 18 ; 31. *Lane-Poole* 56 ; 133. *Aylmer* 90. *N. W. Thomas* 2042. *Dawe* 518. *D. G. Thomas* T. 69. *King-Church* 869. *Vigne* 1186. *Kitson* 1173. *Collenette* 39. *Preuss* 332. (See Appendix).

## 3. **SPATHODEA** Beauv.—F.T.A. 5 : 528.

Branchlets tomentellous ; leaves opposite, unequal in each pair ; leaflets 4–8 pairs, elliptic or oblong, rather gradually acuminate, shortly cuneate and with a large gland at the base, up to 14 cm. long and 6 cm. broad, very minutely reticulate below, with about 6 pairs of lateral nerves ; racemes terminal, few-flowered ; pedicels stout, up to 6 cm. long, finely tomentellous ; calyx recurved, long-acuminate, ribbed, softly tomentellous, 6–8 cm. long split down one side ; corolla widely campanulate from a contracted base, 10–12 cm. long ; fruit 15–20 cm. long ; seeds winged all round, 2 cm. broad (including the hyaline wing) .. .. .. .. .. *campanulata*

**S. campanulata** *Beauv.* Fl. Owar. 1 : 47, t. 27.—F.T.A. 4, 2 : 529 ; Bot. Mag. t. 5091 ; Holl. 3 : 509 ; Chev. Bot. 485. A tree 20–70 ft. high with conspicuous flaming inflorescence, flowers scarlet or orange-red with yellow margin ; habitat mainly fringing forests.
   French Guinea and Sierra Leone to N. and S. Nigeria and Fernando Po ! Extending to Congo and Angola. Exsicc.—*Ansell. Barter* 560. *Mann* 387. *Moloney. Irving. Garrett. Sc.Elliot* 4502. *Smythe* 59. *Farmar* 470. *Chev.* 14916. *Warnecke* 447. *Kersting* A. 631. (See Appendix).

## 4. **MARKHAMIA** Seem.—F.T.A. 5 : 522.

Pseudostipules orbicular, foliaceous, about 2 cm. diam. ; calyx densely lepidote outside, 2·5 cm. long, with a long slender beak in bud, split down one side ; leaflets 3–4 pairs, oblong or oblong-elliptic, gradually acuminate, unequally wedge-shaped at the base, up to 17 cm. long and 7 cm. broad, pubescent only in the axils of the nerves ; panicles small, few-flowered ; corolla about 6 cm. long, contracted for nearly 1 cm. at the base, broadly expanded to the top ; fruit elongate-linear, 1·5 cm. broad, with one nerve down the middle .. .. .. .. .. .. .. 1. *lutea*

Pseudostipules conical, tomentose ; calyx split down one side, tomentose outside, 2·5 cm. long, shortly beaked in bud ; leaflets 4–5 pairs, oblong-elliptic, rather gradually acuminate, shortly wedge-shaped at the base, 8–15 cm. long, 4–6 cm. broad, more or less pubescent or tomentose below ; corolla 5–6 cm. long, gradually expanded from the base ; fruits elongate-linear, 1·5 cm. broad, softly tomentose 2. *tomentosa*

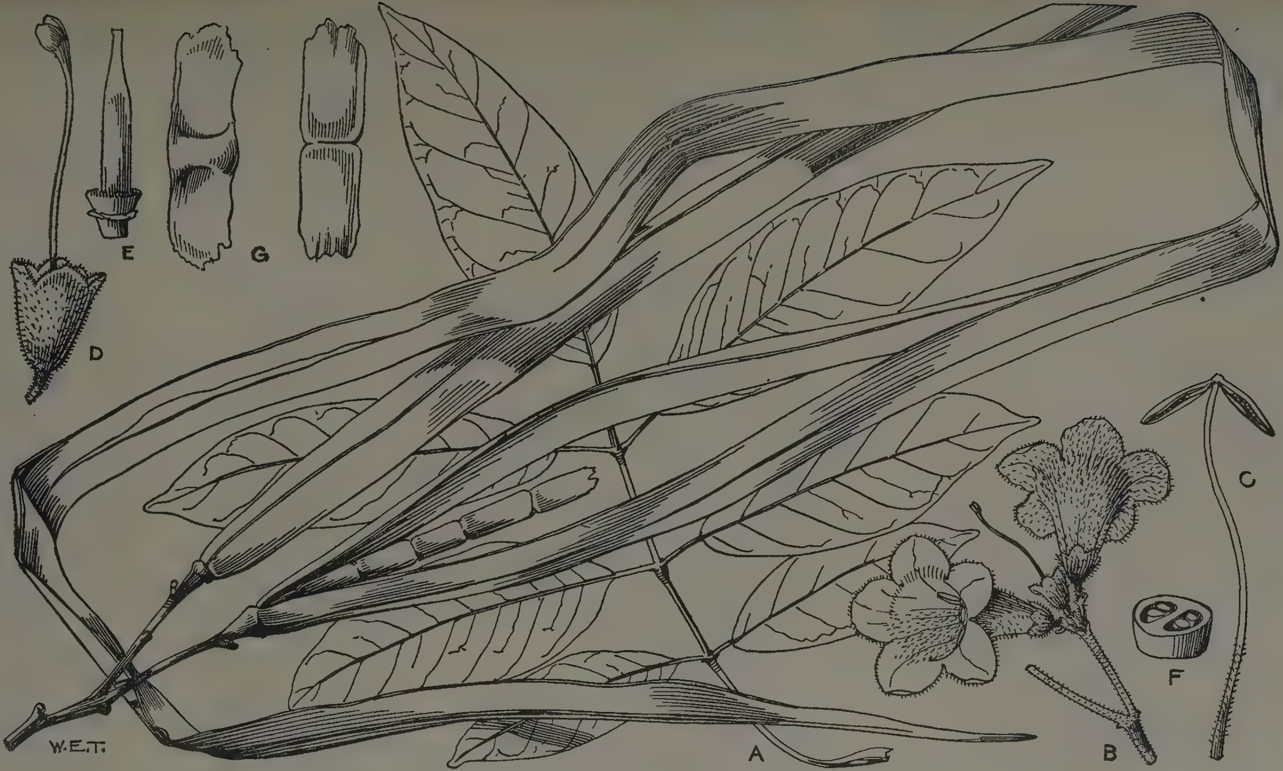

FIG. 261.—FRUITS OF STEREOSPERMUM KUNTHIANUM *Cham.* (BIGNONIACEAE).
A, leaf. B, flowers. C, stamen. D, calyx and style. E, ovary. F, cross-section of ovary. G, Seeds.

1. **Markhamia lutea** *K. Schum.*—F.T.A. 4, 2 : 525 ; Chev. Bot. 486. A shrub or tree 15–30 ft. high with finely scaly branchlets becoming glabrous, and yellow flowers marked with purple, over 2 in. long in terminal and axillary corymbose panicles, and long narrow falcate fruits 1½–3 ft. long with seeds 1¼ in. long including the hyaline wing at each end.

Ivory Coast : Comoé Valley, Yabarasso (Dec.) ! Gold Coast : Anum in forest (Dec.). ? locality ! S. Nigeria : Victoria ! Forest below Buea, 2,500–3,000 ft. (fr. Feb.) ! Buea, 3,500 (Sept.) ! Fernando Po (fl. and fr. Nov.) ! Also in French Cameroons. Exsicc.—*T. Vogel* 60. *Ansell*. *Mann* 5 ; 399. *Brown* 393. *Dalz.* 8237. *Maitland* 475 ; 752. *Plumptre* 38. *Kalbreyer* 33.

2. **M. tomentosa** *K. Schum.*—F.T.A. 4, 2 : 528 ; Holl. 3 : 509 ; Chev. Bot. 486. A tree up to 30 ft. high with yellowish-tomentose branchlets, and yellow flowers with purple lines, 2–2½ in. long in long terminal oblong tomentose racemes, and fruit up to 2 ft. or more long ; habitat commonly fringing forests.

Senegal : Casamance, etc. ! French Guinea : several localities ! Sierra Leone : Falaba (Mar.) ! Ninia, Talla Hills (fr. Feb.) ! Musaia (fr. Oct.) ! Kumala (June) ! Gold Coast : Ejura (fl. and fr. Aug.) ! Togo : fringing forest at the Kue stream ! N. Nigeria : Bassa, Dekina (Aug.) ! Lokoja, Patti ! Also in Cameroons. Exsicc.—*Heudelot* 877. *Barter* 555. *Sc. Elliot* 4992 ; 5281. *Phillips* 58. *Dawodu* 203. *Foster* 101. *Leslie* 37. *Chipp* 770. *N. W. Thomas* 2622. *D. G. Thomas* T. 63. (See Appendix).

var. **gracilis** *Sprague*—F.T.A. 4, 2 : 525 ; Holl. 3 : 509 ; Chev. Bot. 486. Leaflets thin, serrulate, shortly pubescent mainly on the nerves below; inflorescence small and few-flowered ; calyx 1·5–2 cm. long.

N. Nigeria : Nupe ! Lokoja, Patti (Sept.) ! Exsicc.—*T. Vogel* 176. *Barter* 1310. *Elliott* 87 ; 89 ; 242. *Pobéguin* 746. *Kersting* A. 633.

### 5. NEWBOULDIA Seem.—F.T.A. 5 : 520.

Branchlets glabrous ; leaflets 3–6 pairs, oblanceolate to broadly elliptic, serrate to entire or nearly so, long-acuminate, glandular at the base below, up to 20 cm. long and 10 cm. broad, minutely punctate below ; flowers in a terminal racemose panicle ; pedicels 6–8 mm. long, glabrous ; calyx 2·5 cm. long, split down one side and shortly bilobed at the apex, glabrous outside ; corolla nearly regular, narrowly campanulate from a contracted cylindrical base, about 6 cm. long, glabrous outside ; fruit about 30 cm. long, the valves 3-nerved ; seeds winged at each end, 3·5 cm. long *laevis*

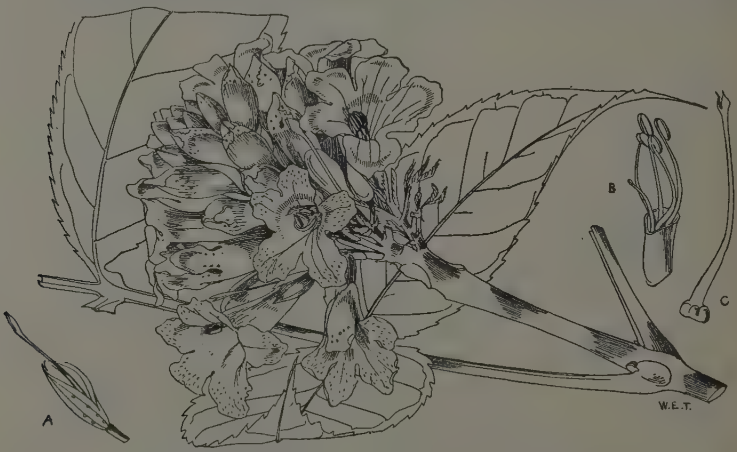

FIG. 262.—NEWBOULDIA LAEVIS *Seem.* (BIGNONIACEAE).
A, calyx and style. B, stamens and part of corolla-tube. C, pistil.

**N. laevis** *Seem.*—F.T.A. 4, 2 : 521 ; Stapf 636 ; Holl. 3 : 508 ; Chev. Bot. 485. *Spathodea laevis* Beauv. Fl. Owar. 1 : 48, t. 29 ; Bot. Mag. t. 4537. A tree of medium size in forest, commonly slender, 10–40 ft. high in towns, nearly glabrous, with red-purple or pink and white foxglove-like flowers 2 in. or more long, in erect dense raceme-like panicle.

Senegal and Gambia to Cameroons and Fernando Po ! Extending to Gabon and Congo, and in St. Thomas Island. Exsicc.—*Döllinger* 36. *Heudelot* 818. *Barter* (no number). *Mann* 84. *Sc. Elliot* 4350. *Garrett* 21. *Brown-Lester* 831 ; 846. *Ozanne* 4. *Moloney*. *Millen* 25 ; 59. *Johnson* 297. *Whyte*. *Dalz.* 184. *Warnecke* 65. *Pobéguin* 129. (See Appendix).

## 142. PEDALIACEAE

Annual or perennial herbs. Leaves opposite or the upper alternate, simple ; stipules absent. Flowers hermaphrodite, zygomorphic. Calyx of 5 or 4 segments or 4-fid or spathaceous. Corolla gamopetalous, often oblique ; lobes 5, imbricate. Stamens 4, or rarely only 2 perfect, alternate with the corolla-lobes ; anthers connivent in pairs, 2-celled, cells distinct, parallel or divaricate, opening lengthwise ; fifth stamen often represented by a staminode. Disk hypogynous, fleshy. Ovary sessile, 1-celled with 2 intrusive parietal placentas or 2–4-celled, the cells again often divided by spurious septa ; style terminal. Ovules solitary or numerous on each placenta. Fruit a capsule, nut, or subdrupaceous ; endocarp hardened and often horned or prickly. Seeds without endosperm ; embryo with flat cotyledons.

Cells of the ovary and capsule very unequal, the posticous one small and indehiscent 1. **Rogeria**
Cells of the ovary and capsule equal-sized :
  Capsule acute or beaked, without lateral appendages .. .. 2. **Sesamum**
  Capsule with 2 divergent horns or spines at the apex .. .. 3. **Ceratotheca**

### 1. ROGERIA J. Gay—F.T.A. 4, 2 : 548.

Stems mealy-glandular in the upper part ; leaves broadly obovate, 3-lobed, truncate or shortly cuneate at the base, 5–10 cm. long, glandular below and rather glaucous ; lobes obtuse, dentate, teeth subulate, with glands at the base ; flowers 1–3 in the leaf-axils, subsessile ; corolla 4–5 cm. long ; capsule 2·5–3 cm. long with 4 spreading spines below the middle, often with 4 smaller between .. .. *adenophylla*

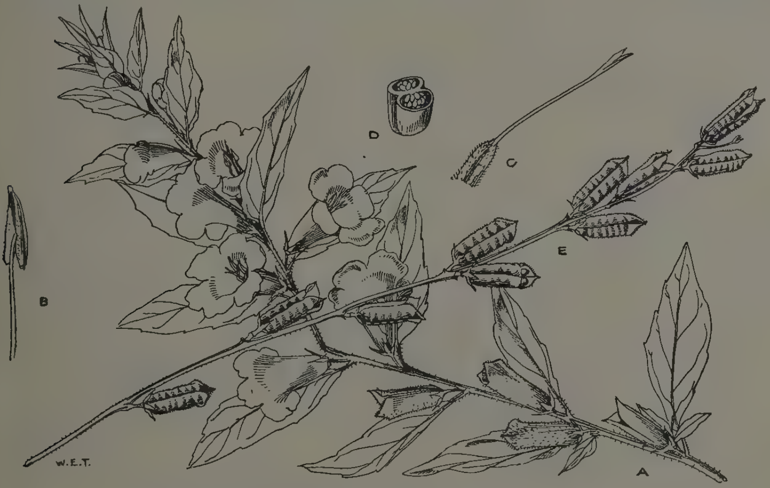

FIG. 263.—SESAMUM RADIATUM *Schum.* (PEDALIACEAE).
A, part of plant. B, stamen. C, pistil. D, cross-section of ovary. E, fruits.

**R. adenophylla** *J. Gay*—F.T.A. 4, 2 : 549. A stout herbaceous undershrub, branched, up to 6 ft. or more high, with very broad leaves strongly 3-nerved at the base, and tubular pink flowers 1½–2 in. long.

Mauritania and French Sudan ! Senegal : Richard Tol (Jan.) ! N. Nigeria : Sokoto, a common weed (July, Sept.) ! Katagum, Keffin Hausa (Oct.) ! Bornu, Kuka (Feb.) ! Extending to E. Sudan, Nubia, Upper Nile Land, and to Angola. Exsicc.—*Roger*. *Döllinger* 68. *E. Vogel* 48. *Dalz.* 100 ; 365. *Moiser* 85. (See Appendix).

### 2. SESAMUM Linn.—F.T.A. 4, 2 : 550.

Lower leaves digitately divided almost to the base, the upper ones undivided ; segments oblanceolate, densely covered with small mealy glands below ; corolla 3 cm. long, pubescent ; capsule 5 cm. long, long-beaked, strigillose ; seeds muricate, with a broad wing at each end .. .. .. .. .. .. .. .. 1. *alatum*
Lower leaves not divided or rarely 3-foliolate ; seeds not winged :
  Erect herbs :
    Lower leaves often 3-foliolate ; seeds smooth .. .. .. .. 2. *indicum*
    Lower leaves never divided, often coarsely toothed ; seeds rugose .. 3. *radiatum*
  Prostate herbs ; leaves lanceolate, acute, about 2 cm. long and 8 mm. broad, pale and very densely glandular below, sparingly so above, subsessile ; flowers axillary, solitary ; pedicels 4 mm. long, glandular ; corolla 4 cm. long, thinly pubescent 4. *Heudelotii*

1. **Sesamum alatum** *Thonn.*—F.T.A. 4, 2 : 559. *S. sabulosum* A. Chev. Bot. 489. Erect herb 2–3 ft. high, with sulcate 4-angled stems finely glandular when young, and pink or bright red foxglove-like flowers with spotted throat.

Mauritania, Senegal and French Sudan ! N. Nigeria : Borgu, in fields ! Kontagora, wayside, waste places, etc. (Dec.) ! Sokoto (Nov.) ! Alkalire (Sept.) ! Bornu, Chad area ! Extending to E. Sudan, Eritrea, E. Africa and S. Trop. Africa. Exsicc.—*Roger*. *Barter* 991. *Dalz.* 151. *Moiser* 12. *Lely* 645.

2. **S. indicum** *Linn.*—F.T.A. 4, 2 : 558 ; Stapf 638 ; Holl. 3 : 511 ; Chev. Bot. 488. Erect, simple or branched, 1–6 ft. high, with sulcate mealy-glandular stems, shortly pubescent at first, and flowers about 1 in. long, whitish or pink and purple-tinged and spotted.

Commonly cultivated from Senegal and French Sudan to N. Nigeria ! Cultivated in most tropical and subtropical countries. Exsicc.—*Roger* 140. *Heudelot*. *Barter* 1260. *Whyte*. *Dalz.* 150. *Lely* 622b ; 671. *Sampson* 38 ; 40. *N. W. Thomas* 74 ; 1114 ; 1658 ; 1776 ; 4274 ; 4596. *G. P. Cooper* 133. (See Appendix).

3. **S. radiatum** *Schum.*—F.T.A. 4, 2 : 557 ; Stapf 638 ; Holl. 3 : 513 ; Chev. Bot. 489. *S. Caillei* A. Chev. Bot. 488. *S. Talbotii* Wernham ? Like the last, up to 4 ft. or more high, more or less glandular-pubescent, with reddish-purple flowers 1–1½ in. long.

Senegal and French Guinea to N. and S. Nigeria and Fernando Po, wild and cultivated ! Also in Cameroons and Congo, and the Cape Verde Islands. Exsicc.—*Heudelot* 547. *T. Vogel* 23. *Barter* 292 ; 1202. *Mann* 734. *Moloney*. *Sc. Elliot* 5857. *Rowland*. *Whyte*. *Dalz.* 149 ; 1080 ; 1244. *Hill* 43. *Yates* 13. (See Appendix).

4. **S. Heudelotii** *Stapf*—F.T.A. 4, 2 : 552. A prostrate herb.

Senegal ! Exsicc.—*Heudelot*.

### 3. CERATOTHECA Endl.—F.T.A. 4, 2 : 562.

Stems pubescent ; leaves ovate-deltoid to ovate or linear-oblong, base more or less truncate or hastate, dentate, 3–6 cm. long ; petiole up to 2·5 cm. long ; corolla 1·5–2·5 cm. long ; capsule about 1·5 cm. long, pubescent ; horns up to 3 mm. long *sesamoides*

**C. sesamoides** *Endl.*—F.T.A. 4, 2 : 563 ; Holl. 3 : 513 ; Chev. Bot. 489. Erect or suberect, branched, ½–2 ft. high, with foxglove-like flowers ¾–1 in. long, solitary in the axils, pink or light red-purple outside, paler with purple streaks inside, sometimes white.

Wild and in places cultivated from Senegal and French Sudan to N. and S. Nigeria ! Throughout tropical Africa. Exsicc.—*Roger* 141. *Heudelot* 147. *Anderson* 55. *Saunders* 9. *Dalz.* 148. *Lamb* 40. *Yates* 39. *Lely* 162 ; 465 ; 622. *Foster* 304. *Sampson* 2 ; 21 ; 39. *Pobéguin* 616. *Kersting* A. 374. (See Appendix).

## 143. ACANTHACEAE

Herbaceous or climbing, rarely somewhat shrubby. Leaves opposite, often with distinct cystoliths ; stipules absent. Flowers hermaphrodite, zygomorphic, often with conspicuous bracts. Calyx-segments or lobes 4 or 5, imbricate or valvate, rarely the calyx reduced to a ring. Corolla gamopetalous, 2-lipped or sometimes 1-lipped, lobes imbricate or contorted. Stamens 4, didynamous or 2, inserted on the corolla-tube and alternate with its lobes ; filaments free amongst themselves or partially connate in pairs ; anthers 2-celled or 1-celled by reduction, cells confluent or separated, sometimes one much smaller than the other, opening lengthwise. Disk present. Ovary superior, sessile on the disk, 2-celled. Capsule mostly elastically dehiscent from the apex downwards, the valves recurved and leaving the central axis. Seeds mostly with indurated funicle ; endosperm rarely present ; embryo large.

Recognised by the usually herbaceous habit, opposite leaves and the peculiar capsule.

*Corolla-lobes contorted in bud :
†Stamens 4 :
‡Anthers 2-celled :
Anther-cells not tailed at the base :
§Ovules superimposed in each cell or rarely 1 :
Ovules 3 or more in each cell :
Corolla not 2-lipped :
Leaves in each pair equal- or subequal-sized :
Anther-cells 8, muticous .. .. .. .. .. 1. **Paulowilhelmia**
Anther-cells 2 :
Flowers solitary or in small cymes, axillary .. .. .. 2. **Ruellia**
Flowers 3–16 in a terminal spike or head, or elongated and loose 3. **Distichocalyx**
Leaves in each pair unequal-sized .. .. .. .. 4. **Endosiphon**
Corolla 2-lipped :
Retinacula curved ; seeds with hygroscopic hairs .. .. 5. **Hygrophila**
Retinacula not curved ; seeds without hygroscopic hairs ; small herbs 6. **Synnema**
Ovules 1–2 in each cell :
Valves of the placenta not rising elastically from the base of the capsule :
Stigma with one linear arm and one minute or obsolete ; seeds with many hygroscopic hairs .. .. .. .. .. .. 7. **Acanthopale**
Stigma capitate, obscurely 2-lobed ; seeds glabrous .. 8. **Whitfieldia**
Valves of the placenta rising elastically from the base of the ripe capsule and throwing out the seeds .. .. .. .. .. 9. **Phaylopsis**

§§Ovules 2, and collateral in each cell :
Fruit dry, beaked, 2-celled .. .. .. .. .. 10. **Thunbergia**
Fruit fleshy, 1-celled .. .. .. .. .. 11. **Afromendoncia**
Anther-cells tailed at the base :
Ovules 3 or more in each cell ; anther-cells 6 .. .. .. 12. **Mimulopsis**
Ovules 2 in each cell ; anther-cells 2 .. .. .. .. 13. **Dyschoriste**
‡‡Anthers 1-celled .. .. .. .. .. .. .. 14. **Physacanthus**
††Stamens 2 :
Ovules 3 or more in each cell ; corolla two-lipped :
Flowers paniculate ; seeds with large curved retinacula.. .. 15. **Brillantaisia**
Flowers verticillate ; seeds with minute conical retinacula .. 6. **Synnema**
Ovules 1–2 in each cell ; corolla not two-lipped .. .. .. 16. **Lankesteria**
**Corolla-lobes imbricate in bud :
Stamens 4 :
Anthers (at least of one pair of stamens) 2-celled :
Anther-cells not tailed :
Shrubs or undershrubs ; bracteoles absent :
Flowers in elongated many-flowered racemes .. .. .. 17. **Thomandersia**
Flowers in short, bracteate, sometimes unilateral spikes .. 18. **Lepidagathis**
Prostrate herb, rooting at the nodes ; bracteoles present, longer than the calyx
19. **Talbotia**
Anther-cells tailed .. .. .. .. .. .. .. 20. **Asystasia**
Anthers 1-celled ; corolla 1-lipped :
Calyx-segments 5 :
Calyx-segments all similar, the adaxial 1-nerved .. .. 21. **Sclerochiton**
Calyx-segments not all similar, the adaxial larger, 2-nerved and often 2-toothed at the top .. .. .. .. .. .. .. .. 22. **Crossandra**
Calyx-segments 4 :
Bracts or leaves spinous :
Seeds covered with rope-like hair bundles, which unroll when moistened
23. **Blepharis**
Seeds glabrous .. .. .. .. .. .. .. 24. **Acanthus**
Bracts and leaves not spinous .. .. .. .. .. 25. **Crosandrella**
Stamens 2 :
†Anthers 2-celled :
Anther-cells at equal or nearly equal heights, the cells not tailed :
Ovules numerous in each ovary-cell ; calyx-segments 4 :
Leaves alternate, subradical, crenate to subentire .. .. 26. **Elytraria**
Leaves opposite, not subradical, entire .. .. .. .. 27. **Nelsonia**
Ovules 1–2 in each cell :
Bracteoles 0 :
Calyx segments 4.. .. .. .. .. .. .. ..28. **Barleria**
Calyx segments 5.. .. .. .. .. .. .. 29. **Eranthemum**
Bracteoles present :
Stigma shortly bifid, not capitate :
Flowers spicate, spikes thyrsoid or solitary .. .. .. 30. **Adhatoda**
Flowers paniculate or subracemose :
Staminodes (2) present .. .. .. .. .. 31. **Graptophyllum**
Staminodes absent .. .. .. .. .. .. 32. **Schaueria**
Stigma subcapitate, entire .. .. .. .. .. 33. **Chlamydocardia**
Stigma undivided, not subcapitate .. .. .. .. .. 34. **Anisotes**
Anther-cells at unequal heights :
Anther-cells not tailed :
Placentas not rising elastically in fruit and not throwing out the seeds :
Seeds smooth .. .. .. .. .. .. .. 35. **Peristrophe**
Seeds tubercular scabrous .. .. .. .. .. 36. **Isoglossa**
Placentas rising elastically in fruit and throwing out the seeds 37. **Dicliptera**
Anther-cells tailed at the base :
Placentas not rising elastically in fruit and not throwing out the seeds :
Capsule 4-seeded ; seeds rough or tubercled .. .. .. .. 38. **Justicia**
Capsule 2-seeded :
Seeds smooth .. .. .. .. .. .. .. 39. **Monechma**
Seeds tubercled .. .. .. .. .. .. .. 40. **Rhinacanthus**
Placentas rising elastically in fruit and throwing out the seeds .. 41. **Rungia**
††Anthers 1-celled :
Flowers not appearing as though enclosed between two opposite bracts :
Shrub up to 4 m. high .. .. .. .. .. .. 42. **Oreacanthus**
Herb up to 1·5 m. high .. .. .. .. .. 43. **Brachystephanus**
Flowers appearing as though enclosed between two opposite bracts which are often connate into a tube .. .. .. .. .. .. 44. **Hypoestes**

### 1. **PAULOWILHELMIA** Hochst.—F.T.A. 5 : 52.

Calyx segments free nearly to the base, 7–8 mm. long, linear, fringed with weak gland-tipped hairs ; leaves small, ovate, acute, rounded at the base, about 4 cm. long and 2·5 cm. broad, densely covered with small rod-like cystoliths, with about 5 pairs of lateral nerves ; corolla 4 cm. long ; stamens exserted .. .. 1. *Sclerochiton*

Calyx-segments united in the lower third, 1·5–2 cm. long, linear, densely glandular-pilose ; leaves mostly rather large, broadly ovate, sometimes lobulate, coarsely dentate, rounded or subauriculate at the base, gradually acuminate, up to 20 cm. long and 15 cm. broad ; panicle lax, many-flowered, with spreading branches ; corolla about 5 cm. long ; capsule about 2 cm. long .. .. .. 2. *polysperma*

Calyx-segments as above but only 1 cm. long, thinly glandular-pubescent ; leaves ovate-rhomboid, crenate, cuneate at the base, softly pubescent, about 8–10 cm. long .. .. .. .. .. .. .. .. .. 3. *pubescens*

1. **P. Sclerochiton** *Lindau*—F.T.A. 5 : 53. Erect branched herb with lilac-purple flowers 1½ in. long.
Cameroons Mt., ? locality ! Also in Upper Congo Basin and Tanganyika. Exsicc.—*Mann* 1259 (partly).

2. **P. polysperma** *Benth.*—F.T.A. 5 : 52 ; Stapf 640 ; Chev. Bot. 494. *P. togoensis* Lindau. *P. speciosa* N.E.Br. in Gard. Chron. 1889 : 749, fig. 106, not of Hochst. A stout erect branched herb with long-petioled-broad leaves and lilac or bluish-purple flowers 1½–2 in. long with darker spots and streaks on the corolla-lobes.
French Guinea : Timbo (Nov.) ! Sierra Leone : Regent ! Sugar Loaf Mt. up to near the top (Dec., Mar.) ! Liberia : Kakatown ! Gold Coast and Togo : common in forest, and in plantations ! S. Nigeria : Lagos Colony, Ikirun, etc. ! Ogwashi (Nov.) ! Ukunzu (Jan.) ! Oban ! Cross R. ! Cameroons Mt., Buea, 3,000 ft. (Dec.) ! Also in French Cameroons. Exsicc.—*Sc. Elliot* 3990 ; 4024. *Easmon.* *Cummins* 181. *Millson.* *Millen* 4. *Johnson* 237 ; 446. *Whyte.* *Dalz.* 147 ; 932. *Krause.* *Buettner* 342. *Kersting* 721. *Mildbr.* 7234. (See Appendix).

3. **P. pubescens** *Lindau* in Bull. Soc. Bot. Fr., Mém. 8b : 49 ; Chev. Bot. 494. Erect herbaceous undershrub 3 ft. high with 4-angled stems pubescent when young, densely pubescent leaves and bluish flowers 1–1¼ in. long.
French Guinea : Kindia, Mt. Gangan, 2,400 ft. (Mar.) ! Futa-Jallon, Ditinn-Diaguissa Plateau, 4,000–4,300 ft. (Apr.) ! Exsicc.—*Chev.* 12920 bis ; 13120 bis ; 13224 bis ; 13468 ; 13843 bis.

### 2. **RUELLIA** Linn.—F.T.A. 5 : 44.

Calyx-lobes linear-subulate, about 5 mm. long ; corolla 2·5 cm. long, the linear-cylindric portion up to 1 cm. long ; leaves ovate-elliptic to lanceolate, subacute, 3–4 cm. long, 1–2 cm. broad, setulose-pubescent ; stamens 4 ; anther-cells not spurred at the base ; style pubescent, one style-arm suppressed ; fruit 1·5 cm. long, club-shaped, glabrous . 1. *patula*

Calyx-lobes filiform 6–7 mm. long ; corolla about 5 cm. long, inflated in the upper third, the linear-cylindric portion 3 cm. long ; leaves broadly ovate-lanceolate to elliptic, acutely acuminate, 5–10 cm. long, 2–5 cm. broad ; stamens, style and fruit as above 2. *ardeicollis*

1. **R. patula** *Jacq.*—F.T.A. 5 : 45 ; Jacq. Ic. Pl. Rar. 1 : 12, t. 119 ; Chev. Bot. 494. A decumbent undershrub with white or blue-purple flowers, the corolla pubescent outside, 1 in. or more long.
Sierra Leone ! Ivory Coast : Sassandra Basin, between Gaouloubré and Soubré (May) ! Gold Coast : Accra (Nov.) ! Widely spread in tropical Africa. Exsicc.—*Brass.* *Brown* 362. *Chev.* 17788.

2. **R. ardeicollis** *R. Ben.* in Chev. Bot. 494, name only. A slightly woody herb 1 ft. or more high, with white flowers about 2 in. long more or less like the last but with a longer tube.
Ivory Coast : Middle-Sassandra, between Sifié and Séguéla (June) ! Morénou, between Anoumaba and Sahoua (Nov.) ! Also in Angola. Exsicc.—*Chev.* 21816 ; 22436.

### 3. **DISTICHOCALYX** Benth.—F.T.A. 5 : 60.

Lateral nerves 6–7 pairs ; bracts early deciduous ; leaves narrowly obovate, acutely cuneate at the base, acuminate, 10–15 cm. long, 3–7 cm. broad, with numerous short rod-like cystoliths on both surfaces ; spikes few-flowered ; calyx-segments linear-oblanceolate, acute, 2 cm. long ; corolla 6 cm. long ; fruit 2 cm. long, narrow, glabrous 1. *thunbergiaeflorus*

Lateral nerves 10 pairs ; bracts persistent, 2·5 cm. long ; leaves as above ; calyx-segments scarcely 1·5 cm. long .. .. .. .. .. 2. *obanensis*

Lateral nerves 5–6 pairs ; bracts early deciduous ; leaves ovate, acute, broadly cuneate, 3·5–5·5 cm. long, about 2 cm. long slightly pubescent below ; flowers solitary ; calyx segments filiform, 1 cm. long ; corolla-tube 3 cm. long .. .. 3. *togoensis*

1. **D. thunbergiaeflorus** *Benth.*—F.T.A. 5 : 62. *D. ruellioides* S. Moore. A herbaceous undershrub several feet high, woody below, glabrous except on the young parts, with spikes of violet-purple flowers 1½–2 in. long.
S. Nigeria : Oban ! Fernando Po, 1,300–2,000 ft. ! Exsicc.—*Mann* 316 ; 1446., *Talb.* 1527.

2. **D. obanensis** *S. Moore* in Cat. Talb. Nig. Pl. 77. An undershrub like the last with pale violet flowers.
S. Nigeria : Oban ! Exsicc.—*Talb.* 73 ; 1485.

3. **D. togoensis** *Lindau* in Engl. Bot. Jahrb. 33 : 188.
Togo : Lome (Oct.). Exsicc.—*Warnecke* 264.

### 4. **ENDOSIPHON** T. Anders. *ex* Benth.—F.T.A. 5 : 49.

Stems long-pilose ; leaves anisophyllous, one sometimes very small, ovate to oblong-elliptic, acuminate, rounded and very unequal-sided at the base, 6–10 cm. long, 2·5–5 cm. broad, marked with linear cystoliths on both surfaces, thinly pilose on the nerves below ; flowers solitary ; pedicels up to 4 cm. long, pilose or pubescent ;

calyx-lobes slightly unequal, linear, 2·5–3 cm. long, 1-nerved, pilose ; corolla-tube up to 5 cm. long, narrow, limb about 4 cm. diam., with rounded lobes ; anthers 4, deep in the corolla-tube, linear ; fruit linear, 2 cm. long, valves grooved in the middle *primuloides*

E. **primuloides** *T. And.* ex *Benth.*—F.T.A. 5 : 49 ; Chev. Bot. 496 (incl. var. *hirsuta* R. Ben.). *E. obliquus* C.B.Cl. ; Stapf 638. Herb or small half-woody undershrub in forest, 1–3 ft. high, clothed with multicellular hairs, with pale blue or lilac slender-tubular flowers with spreading limb.

Sierra Leone : Gola Forest (Nov.) ! Liberia : Monrovia ! Ivory Coast : common ! Gold Coast : Kibbi Hills (Dec.) ! Bompata (Dec.) ! Aniwase (Oct.) ! Amentia ! S. Nigeria : Oban ! Fernando Po, 1,000 ft. (Nov.) ! Extends to Gabon. Exsicc.—*Mann* 571. *Johnson* 262. *Whyte. Farmar* 579. *Dalz.* 151. *Fishlock* 59. *Irvine* 546. *Deighton* 370. *Talb.* 979.

## 5. **HYGROPHILA** R.Br.—F.T.A. 5 : 30.

Inflorescence laxly cymose, axillary, few-flowered ; leaves sessile, linear to narrowly lanceolate, subacute, up to 10 cm. long and 1·5 cm. broad, minutely and closely puberulous below ; calyx-segments linear, unequal, up to 1 cm. long ; corolla 2 cm. long, shortly pubescent .. .. .. .. .. .. .. 1. *laevis*

Inflorescence subspicate or an axillary cluster :

Flowers not accompanied by spines :

Inflorescence continuous, spike-like ; bracts and calyx-segments markedly pectinate-ciliate, linear ; corolla about 1·5 cm. long ; leaves linear, up to 5 cm. long, with rod-like cystoliths on the upper surface .. .. .. .. 2. *senegalensis*

Inflorescence not spike-like, the flowers in interrupted axillary clusters :

Calyx and bracts densely setose-ciliate with white stiff hairs :

Flowers few in each cluster .. .. .. .. .. 2. *senegalensis*

Flowers numerous in each cluster :

Flower-clusters 1·5 cm. diam. ; calyx-segments 5–6 mm. long ; leaves linear, up to 5 cm. long, with rod-like cystoliths on the upper surface ; fruit 8 mm. long 3. *barbata*

Flower-clusters about 3–3·5 cm. diam. ; calyx-segments 1 cm. long ; leaves linear, about 10 cm. long, pilose-setose on the upper surface .. 4. *lutea*

Calyx and bracts softly pilose (not markedly setose) ; flowers very few or several at each node :

Leaves softly and shortly pubescent all over the lower surface, oblanceolate, up to 12 cm. long and 2·5 cm. broad ; bracts lanceolate, 1 cm. long, softly pubescent ; corolla about 2 cm. long .. .. .. .. .. .. 5. *odora*

Leaves shortly setose-pilose only on the nerves below, oblanceolate, nervose, 4–8 cm. long, up to 3 cm. broad ; bracts much shorter than the calyx-segments, the latter linear-filiform ; corolla 2 cm. long .. .. .. .. 6. *Teuczii*

Flowers accompanied by stiff spines up to 4 cm. long ; leaves elongate-oblanceolate to linear-oblanceolate, up to 25 cm. long and 3·5 cm. broad, more or less setose-pilose on the upper surface, with inconspicuous rod-like cystoliths below ; bracts and calyx-segments setose with white hairs .. .. .. .. .. 7. *spinosa*

1. **Hygrophila laevis** *Lindau*—F.T.A. 5 : 36. A woody herb, erect, branched, rooting at the lower nodes, with obscurely angled shortly-pubescent stems and pink or yellowish flowers ⅜ in. long.

Senegal ! N. Nigeria : Nupe ! Kontagora, by stream margins and pools (Jan.) ! Exsicc.—*Heudelot* 197. *Barter* 1139 ; 1285. *Dalz.* 154.

[illegible]. **H. senegalensis** *T. Anders.*—F.T.A. 5 : 34 ; Chev. Bot. 492. *H. micrantha* T. Anders. Herb, erect, branched, with 4-angled glabrous stems, spongy at the base when in damp ground, and violet-purple flowers ¾ in. long.

French Sudan : Koulikoro ; Sahara ! Senegal : several localities ! Gambia ! Sierra Leone : N. Prov., Mamaka (Feb.) ! Gold Coast : Afram Plains (Dec.) ! N. Nigeria : Lokoja, top of Patti (Oct.) ! Katagum (Sept.) ! Exsicc.—*Roger* 32. *Richard. Heudelot* 139. *Brown-Lester* 12. *Dalz.* 103. *Irvine* 619. *Glanville* 165.

[illegible]. **H. barbata** *T. Anders.*—F.T.A. 5 : 32 ; Chev. Bot. 492. Erect branched from the base, a few inches to 1 ft. or more high, pilose on the young parts and inflorescence, with flowers ⅓ in. long in dense whorls.

Senegal : Casamance R. ! French Guinea : Grandes Chutes. Sierra Leone : Samu country, Ruka (Dec.) ! Talia (Feb.) ! Exsicc.—*Heudelot* 573. *Sc. Elliot* 4329. *Garrett. N. W. Thomas* 8865.

4. **H. lutea** *T. Anders.*—F.T.A. 5 : 32. Erect herb 2 ft. high, with long internodes, bristly-hairy, and yellow flowers in very dense round whorls which are white-hairy.

S. Nigeria : Onitsha ! Exsicc.—*Barter* 1163.

5. **H. odora** *T. Anders.*—F.T.A. 5 : 33 ; Chev. Bot. 492. *H. acutisepala* A. Chev. Bot. 492, not of Burkill. Erect pubescent herb, up to 2–3 ft. high, with reddish or bluish-purple flowers ¾–1 in. long.

French Sudan : Cas Sicoro (Jan.) ! Senegal : Casamance, Sedhiou to Tambanaba (Feb.) ! French Guinea : ? localities ! Between the Santa R. and Timbo ; Futa-Jallon. Sierra Leone : Mofari, Scarcies R. (Jan.) ! Pujehun (Feb.) ! Konno country ! Makump, R. Seli (inundated, June-Oct.) ! Exsicc.—*Heudelot* 807. *Sc. Elliot* 4723. *Farmar* 301. *Burbridge* 504. *N. W. Thomas* 8395. *Glanville* 134. *Paroisse* 5. *Chev.* 210 ; 2793.

6. **H. Teuczii** *Lindau*—F.T.A. 5 : 33. A square-stemmed herb 1–2 ft. high the stems hairy at first becoming glabrous, with lilac-purple flowers ¾–1 in. long.

N. Nigeria : Bauchi Plateau, Vom, 3,000–4,500 ft. ! Panyam, in marshes (Sept.) ! Also in Shari-Chad and Angola. Exsicc.—*Lely* 726. *Dent Young* 196 ; 197.

7. **H. spinosa** *T. Anders.*—F.T.A. 5 : 31 ; Holl. 3 : 514 ; Chev. Bot. 493. A stout erect herb of wet places, 2–3 ft. or up to 6 ft. or more, with 4-angled usually bristly stem, and bluish or purple flowers 1–1¼ in. long in dense whorls with about 6 strong spines.

Senegal and Gambia to N. and S. Nigeria ! In tropical Africa generally, also in India and Ceylon. Exsicc. —*Heudelot. Boteler. T. Vogel* (no number). *Barter* 773 ; 2164. *Brown-Lester* 15. *Rowland. Millen* 72. *Dawodu* 64. *Warnecke* 227. (See Appendix).

### 6. **SYNNEMA** Benth.—F.T.A. 5 : 29.

Stamens 4, inserted at the top of the tube ; stems quadrangular, pilose with weak hairs ; leaves sessile, narrowly lanceolate, about 4–5 cm. long and 1 cm. broad, entire, pilose ; flowers crowded at the nodes ; bracts foliaceous, lanceolate, pilose, about 1 cm. long ; corolla-tube 3 mm. long ; style pubescent .. .. 1. *brevitubum*

Stamens 2 ; stems glandular-puberulous ; leaves of two forms, the lower submerged and pinnatifid, the upper sessile, linear-oblanceolate, 2–5 cm. long, about 6 mm. broad, puberulous ; flowers at the nodes ; bracts foliaceous, up to 1 cm. long, pilose ; corolla-tube 5–6 mm. long ; style pubescent .. .. .. .. 2. *africanum*

1. **S. brevitubum** *Burkill*—F.T.A. 5 : 30. *Cardanthera parviflora* Turrill. A branched hairy herb attaining 2–3 ft. in height amongst grass, with white orchid-like flowers.
   Gold Coast : Afram Plains (Dec.) ! Salaga ! Togo : Kratchi, on Volta R. ! Exsicc.—*Krause. Irvine* 886.
2. **S. africanum** *O. Ktze.*—F.T.A. 5 : 29. A branched herb of swamps with white 2-lipped flowers.
   N. Nigeria : Jebba ! Exsicc.—*Barter* 751.

### 7. **ACANTHOPALE** C.B.Cl.—F.T.A. 5 : 62.

Filaments pubescent ; leaves very unequal in each pair, the larger obovate, long-acuminate, attenuated at the base into the winged petiole, up to 25 cm. long (including the petiole) and 7 cm. broad, with scattered rod-like cystoliths on both surfaces ; racemes with few and distant flowers ; calyx-lobes 1 cm. long ; corolla 4 cm. long, widely funnel-shaped in the upper part, thinly pilose outside .. .. 1. *laxiflora*

Filaments glabrous ; leaves as above but smaller and more or less pilose on the nerves below ; flowers smaller and more crowded ; calyx-lobes scarcely 1 cm. long ; corolla 2·5 cm. long, the lobes more densely pilose outside .. .. .. 2. *decempedalis*

1. **A. laxiflora** *C.B.Cl.*—F.T.A. 5 : 63. Glabrous undershrub with funnel-shaped white flowers 1¼ in. long.
   Cameroons Mt., above Buea, 3,900 ft. ! Also in E. Africa. Exsicc.—*Preuss* 947.
2. **A. decempedalis** *C.B.Cl.*—F.T.A. 5 : 63. A soft-wooded shrub or undershrub up to 10–12 ft. high, with white funnel-shaped flowers ¾–1 in. long.
   Fernando Po, 7,000 ft. (Mar.) ! Exsicc.—*Mann* 2347 ; 3747.

### 8. **WHITFIELDIA** Hook.—F.T.A. 5 : 65.

Corolla-tube very slender, elongated, abruptly expanded into the limb :

Corolla-tube pubescent, about 5 cm. long ; lobes oblong-elliptic, 2 cm. long ; calyx-segments broadly linear, 3 cm. long, glandular-pilose ; leaves more or less elliptic, long-acuminate, acutely cuneate at the base, 6–18 cm. long, 3–6 cm. broad, minutely pustulate on the upper surface ; bracts ovate, about 1·5 cm. long .. 1. *longifolia*

Corolla-tube glabrous or nearly so .. .. .. 1. *longifolia* var. *perglabra*

Corolla-tube gradually expanded from the base, about 2·5 cm. long :

Bracteoles broadly and obliquely obovate, about 0·8–1 cm. long ; flowers rather few :

Corolla 3–3·5 cm. long ; leaves oblong-lanceolate to ovate-elliptic, acutely acuminate, acute at the base, 10–18 cm. long, 3–7 cm. broad, pubescent on the midrib below ; fruit 2 cm. long .. .. .. .. .. .. .. .. 2. *lateritia*

Corolla 2 cm. long, very broad ; inflorescence rather elongated ; leaves as above, but midrib glabrous .. .. .. .. .. .. .. .. 3. *Preussii*

Bracteoles lanceolate to narrowly elliptic, 1–1·5 cm. long ; flowers rather numerous ; corolla 3 cm. long ; leaves oblong-lanceolate to ovate-elliptic, acutely acuminate, acute at the base, 10–18 cm. long, 3–7 cm. broad, glabrous ; fruit 2 cm. long 4. *colorata*

1. **Whitfieldia longifolia** *T. Anders.*—F.T.A. 5 : 66. *W. elongata* C.B.Cl. *W. subviridis* C.B.Cl.—Stapf 640. Nearly glabrous undershrub, erect, several feet high, or straggling and half-scandent, with pith in the stems, constricted nodes, and conspicuous white flowers 2–3 in. long with petaloid calyx in terminal panicles.
   S. Nigeria : Lagos Colony, Igbessa, etc. (May) ! Benin district, several localities ! Ibuzo (Nov.) ! Agolo ! Oban ! Calabar district, Okeyon, etc. (Jan.) ! Fernando Po (Nov., Jan.) ! Extends to Angola, E. Sudan and Tanganyika. Exsicc.—*T. Vogel* 187 ; 242. *Barter* 2069. *Mann* 198. *Millen* 141 ; 195. *Dennett* 38. *Farquhar* 30. (See Appendix).
   var. **perglabra** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined.
   Fernando Po ! Exsicc.—*Mann.*
2. **W. lateritia** *Hook.* Bot. Mag. t. 4155.—F.T.A. 5 : 67 ; Stapf 640. *W. latiflos* C.B.Cl.—Stapf 640. *Asystasiaamoena* Turrill. A forest undershrub about 10 ft. high, with red or salmon flowers 1–1½ in. long in terminal pubescent racemes.
   Sierra Leone : fairly common ! Liberia : Kakatown ! Exsicc.—*Whitfield. Winwood Reade. Sc. Elliot* 3976 ; 4933. *Whyte. Lane-Poole* 180 ; 194. *N. W. Thomas* 4018 ; 4574 ; 4762. *Burbridge* 495. *Dawe* 406. *Glanville* 123.
3. **W. Preussii** *C.B.Cl.*—F.T.A. 5 : 67. A nearly glabrous undershrub with yellow flowers scarcely 1 in. long in a long terminal raceme.
   S. Nigeria : Barombi ! Also in French Cameroons. Exsicc.—*Preuss* 516.
4. **W. colorata** *C.B.Cl.* ex *Stapf* in Johnston, Liberia 2 : 640. A glabrous undershrub about 10 ft. high, with short dense panicles of bright red or reddish-purple flowers 1–1½ in. long, the bracts turning brick-red.
   Sierra Leone : Jepihun (Dec.) ! Falaba ! Kenema (Feb.) ! Pujehun (Feb.) ! Gbanbama (Mar.) ! Giewahun (Nov.) ! Liberia : Kakatown ! Sino Basin ! Monrovia ! Dukwia R. (Oct., Nov., Feb.) ! Exsicc.—*Whyte. Smythe* 228. *Burbridge* 471. *N. W. Thomas* 7967 ; 8451 ; 8642 ; 8649 ; 8663 ; 9014. *Deighton* 363. *G. P. Cooper* 34 ; 152.

### 9. **PHAYLOPSIS** Willd.—F.T.A. 5 : 82.

Abaxial calyx-segments broadly spathulate-oblanceolate, long-ciliate ; inflorescence strobilate, short, sessile or subsessile ; bracts broadly ovate-orbicular, about 1 cm.

long, thin and reticulate, ciliate ; leaves long-petiolate, ovate to ovate-lanceolate, up to 12 cm. long and 5 cm. broad, crenate except towards the base 1. *falcisepala*

Abaxial calyx-segments linear or subulate-lanceolate :

Leaves very small, at most about 5 cm. long and 2·5 cm. broad, rounded at the apex ; flower-clusters ellipsoid, not strobiliform ; bracts ciliate with long rather stiff hairs 2. *microphylla*

Leaves larger, shortly acuminate, the largest about 8 cm. long and 4 cm. broad, shortly pubescent ; flower-clusters mostly strobiliform ; bracts ovate-orbicular, about 1 cm. long, ciliate, nervose .. .. .. .. .. .. .. .. 3. *parviflora*

Leaves as above, ovate-lanceolate, gradually acuminate, shortly cuneate at the base, long-petiolate, about 10 cm. long and 3·5 cm. broad, pubescent on the nerves below, with distinct parallel tertiary nerves ; bracts large, suborbicular to ovate-lanceolate 1·5–2 cm. long, venose .. .. .. .. .. .. .. 4. *Barteri*

1. **Phaylopsis falcisepala** *C.B.Cl.*—F.T.A. 5 : 84 ; Stapf 640. *P. longifolia* T. Thoms. ? Herb or weak undershrub up to 4 ft. high, erect or decumbent, with dense ovoid or short-cylindric spikes of small flowers red or white with purple markings.

French Guinea : ? locality ! Sierra Leone : very common by forest paths, etc. ! Liberia : Kakatown ! Gold Coast : Agogo (Dec.) ! Togo : Misahöhe (Nov.) ! N. Nigeria : Kontagora (Nov.) ! S. Nigeria : Lagos (Dec.) ! Lagos Colony ! Onitsha (Oct.) ! Extends to Upper Nile Land. Exsicc.—*Sc. Elliot* 3993. *Millson* 127. *Whyte. Dalz.* 186 ; 1242. *Mildbraed* 7226. (See Appendix).

2. **P. microphylla** *T. Anders.*—F.T.A. 5 : 85. Habit of the last, with smaller leaves and looser flower-clusters.

Gold Coast : Assin Yan Kumasi ! S. Nigeria : Oban ! Cameroons Mt., Buea. Extends to Gabon. Exsicc.—*Cummins* 71. *Talb.* 994.

[illegible]. **P. parviflora** *Willd.*—F.T.A. 5 : 83 ; Chev. Bot. 495. *P. Talbotii* S. Moore. A more or less hairy and slightly viscid herb or small undershrub 1–2 ft. high, with small white or purplish flowers in ovoid or short-cylindric spikes.

French Sudan : Tabacco (Jan.). Senegal ! Gambia ! Sierra Leone : common by forest paths and in open cultivation ! S. Nigeria : Oban ! Also in Abyssinia, to E. Africa and Nyasaland. Exsicc.—*Heudelot* 585. *Brown-Lester* 11. *Sc. Elliot* 4426 ; 5693. *Dalz.* 8076. *Deighton* 501. *N. W. Thomas* 6416 and others. *Talb.* 977. (See Appendix).

4. **P. Barteri** *T. Anders.*—F.T.A. 5 : 86. A weak undershrub 2–4 ft. high in woodland undergrowth, etc., with white flowers ⅜ in. long, well exserted from the bracts, in dense strobilate spikes 1–3 in. long and 1 in. broad.

Togo : Bismarckburg (Sept.–Nov.) ! Atakpame (Nov.) ! N. Nigeria : Nupe ! Lokoja, Kabba Road (Oct.) ! Toro (Oct.) ! S. Nigeria : Onitsha ! Victoria. Extends south to Gabon, and to E. Africa. Exsicc.—*Barter* 845 ; 913. *Parsons* 80. *Lely* 683. *Kling* 193. *Buettner* 336. *Mildbraed* 7461.

## 10. THUNBERGIA Linn.—F.T.A. 5 : 8.

Petioles winged, 1–2 cm. long ; leaves ovate-triangular, sagittate or hastate at the base, 3·5–7 cm. long, 2·5–4·5 cm. broad, pubescent, entire or undulate-dentate ; flowers axillary, solitary ; pedicels up to 6 cm. long ; bracteoles ovate, subcordate, about 2 cm. long ; corolla-tube 2 cm. long, limb oblique, 1·5 cm. long ; fruit 2·5 cm. long 1. *alata*

Petioles not winged :

*Climbing herbs :

Flowers 2–3 together between two sessile leaves on a peduncle-like branchlet ; leaves very broadly ovate, cordate, acutely acuminate, 7–9 cm. long, up to 6 cm. broad, pubescent on the nerves below, repand-dentate ; petiole up to 6 cm. long ; bracteoles ovate-elliptic, mucronate, 2 cm. long ; corolla 6 cm. long 2. *fasciculata*

Flowers solitary and free from the leaves :

Leaves entire, or at most undulate :

Leaves lanceolate, sometimes with a tooth on each side at the base, rounded at the base, 4–10 cm. long, acute, minutely setulose ; bracteoles lanceolate, 1·5 cm. long ; corolla 2·5 cm. long ; fruit 1·5 cm. long, pubescent .. .. 3. *fragrans*

Leaves ovate or triangular :

Leaves acutely mucronate, cordate at the base, up to 6 cm. long and 4 cm. broad, glabrous ; petiole pubescent ; flowers solitary ; bracteoles ovate-lanceolate, 1 cm. long ; corolla 2 cm. long ; fruit 1·5 cm. long, softly puberulous 4. *cynanchifolia*

Leaves gradually acuminate, rounded-subcordate at the base, about 17 cm. long and 8 cm. broad, prominently trinerved at the base, glabrous ; bracteoles narrowly ovate, 1·5 cm. long, venose ; calyx lobed ; corolla-tube 4 cm. long 5. *togoensis*

Leaves lobulate or lobed, widely cordate at the base, lobes triangular, setose-pilose on the upper surface ; petiole slender ; flowers solitary ; pedicel up to 5 cm. long ; bracteoles ovate, 2·5 cm. long, slightly setulose outside ; calyx obsolete, truncate ; corolla 8–10 cm. long, broadly tubular .. .. .. .. .. 6. *chrysops*

**Shrubs or woody climbers :

Bracteoles densely covered outside with very small stellate hairs :

Bracteoles ovate : rounded at the apex, 3 cm. long and 2·5 cm. broad ; corolla hispid outside near the base, about 7 cm. long ; leaves broadly elliptic, acuminate, shortly cuneate at the base, about 12 cm. long and 7 cm. broad, nearly glabrous 7. *rufescens*

Bracteoles oblong-elliptic, apiculate, 2 cm. long, ribbed, densely brown-tomentose ;

leaves elliptic, very shortly acuminate, rounded at the base, 8 cm. long, 4 cm. broad, glabrous .. .. .. .. .. .. .. 8. *combretoides*

Bracteoles glabrous :

Calyx about 1 cm. long ; leaves oblong to elliptic, acuminate, subacute at the base, 10–15 cm. long, up to 8 cm. broad, glabrous, entire ; bracteoles 2 cm. long ; corolla 6–7 cm. long .. .. .. .. .. .. 9. *Vogeliana*

Calyx at most 3 mm. long ; leaves small, ovate to broadly lanceolate, acute, 3–4·5 cm. long, 1·5–2 cm. broad, subentire ; bracteoles soon deciduous ; corolla 6 cm. long 10. *erecta*

1. **Thunbergia alata** *Boj.*—F.T.A. 5 : 16 ; Stapf 638. A softly pubescent herbaceous twiner, with pale to dark yellow flowers (sometimes white) usually red or dark purple in the throat.
Sierra Leone : Freetown, common ! Regent, etc., Njala, common (July) ! Liberia : Kakatown and Sino Basin ! Native in tropical Africa and introduced into all warm countries. Exsicc.—*Winwood Reade. Whyte. Deighton* 755.

2. **T. fasciculata** *Lindau*—F.T.A. 5 : 15. *T. nidulans* Lindau. Climbing with sparingly pilose stems ; flowers completely hidden until full-blown.
Togo : Sokode-Basari ! Cameroons Mt. : Buea ! Exsicc.—*Preuss* 987. *Kersting* 382 (84).

3. **T. fragrans** *Roxb.*—F.T.A. 5 : 20. A slender twiner, sparingly hairy with whitish flowers 1½ in. long.
Sierra Leone : Regent and elsewhere (Oct., Dec.) ! Common in the Eastern tropics and probably introduced into Africa and elsewhere.

4. **T. cynanchifolia** *Benth.*—F.T.A. 5 : 20 ; Chev. Bot. 490. A slender climbing plant, on trees, etc., with pure white flowers ¾–1 in. long, the stems either glabrous or spreading-pilose.
Liberia : Dukwia R. (Oct., Nov.) ! Gold Coast : Aburi (Oct.) ! S. Nigeria : Niger R. ! Akassa (Aug.) ! Awka and Agolo ! Eket ! Oban ! Rio del Rey ! Also in Cameroons. Exsicc.—*T. Vogel* 7 ; 58. *Johnston* 44. *Brown* 346 ; 375. *N. W. Thomas* 729 ; 1146. *Talb.* 3016. *G. P. Cooper* 10.

5. **T. togoensis** *Lindau*—F.T.A. 5 : 22. A glabrous climber, with blue flowers 2 in. long.
Togo : Misahöhe, near Aundjowe-Avatime, 2,000 ft. Exsicc.—*Baumann* 74.

6. **T. chrysops** *Hook.* Bot. Mag. t. 4119—F.T.A. 5 : 21 ; Chev. Bot. 490. *T. geraniifolia* Benth.—F.T.A. 5 : 21 ; Chev. Bot. 491. *T. Talbotiae* S. Moore. *T. subnymphaeifolia* Lindau. A slender climber, pilose on the young stems, glabrescent, with beautiful violet-purple flowers 3–4 in. long, with yellow throat.
French Guinea : Kouria and neighbourhood (Sept.) ! Futa-Jallon, between Timbo and Ditinn (Sept.) ! Sierra Leone : Regent, and various other localities ! Gold Coast : Kibbi ! Bou, W. Prov. (Nov.) ! Togo : Sokode-Basari ! S. Nigeria : Eket, near Awa ! Exsicc.—*Don. Sc. Elliot* 4039. *Burbridge. Vigne* 1583. *Chev.* 14972. *Kersting* 585. *Talb.* 3394. (See Appendix).

7. **T. rufescens** *Lindau*—F.T.A. 5 : 10. A shrub about 20 ft. high, rusty stellate-tomentose on the young parts with purple flowers 2½–3 in. long.
S. Nigeria : forest between Barombi-ba-Mbu and Kake (Sept.) ! Exsicc.—*Preuss* 482.

8. **T. combretoides** *A. Chev.* Bot. 490, name only. A lofty woody climber with arm-thick stem with adventitious roots at the base, and white flowers in fascicles on the old wood.
Ivory Coast : Cavally Basin, Tépo country, Nékaougnié (July) ! Grabo (Aug.) ! Exsicc.—*Chev.* 19600 ; 19745.

9. **T. Vogeliana** *Benth.*—F.T.A. 5 : 10 ; Bot. Mag. t. 5389 ; Holl. 3 : 514. A branching shrub, up to 15 ft. or more high, with flowers 2–3 in. long, pale or dark violet-purple with white tube.
S. Nigeria : Iseneki, Benin district (Apr.) ! Onitsha (Oct.) ! Oban ! Victoria ! Barombi, Elephant Lake (Aug.) ! Likomba ! Fernando Po (Nov.) ! Exsicc.—*T. Vogel* 147. *Mann* 557 ; 558. *Farquhar* 199. *Preuss* 387. *Kalbreyer. Mildbraed* 10526.

10. **T. erecta** *T. Anders*—F.T.A. 5 : 12 ; Bot. Mag. t. 5013 ; Holl. 3 : 514 ; Chev. Bot. 491. A stiff much-branched shrub up to 6–8 ft. high, with 4-angled branchlets pubescent at the nodes, and flowers 2–2½ in. long, violet-purple with yellow throat.
French Guinea : Conakry. Sierra Leone : Sherboro ! Gold Coast : Cape Coast (July) ! N. Nigeria : Sokoto Province (Nov.) ! Nassarawa, Mada Hills ! Bauchi Plateau, Vom, 3,000–4,500 ft. ! S. Nigeria : Lagos (Feb.) ! Calabar district ! Often planted in gardens. Exsicc.—*T. Vogel* 14 ; 83. *Garrett* in Herb. *Sc. Elliot* 5856. *Moiser* 71. *Hepburn. Dent Young* 203a.

## 11. AFROMENDONCIA Gilg—F.T.A. 5 : 6.

Stems 4-angled, villous when young ; leaves ovate-oblong, shortly acuminate, 5–8 cm. long, up to 4 cm. broad, pilose below, with 5–6 pairs of lateral nerves ; petiole up to 3 cm. long ; flowers axillary, fasciculate ; pedicels about 2 cm. long, villous ; flower-buds broadly ovoid ; bracteoles 2, ovate, 1 cm. long ; calyx short ; corolla-tube 2 cm. long ; anthers hairy at the base .. .. .. .. .. 1. *Gilgiana*

Stems terete, thinly pubescent ; leaves broadly elliptic, slightly pointed, rounded at the base, 10–14 cm. long, 5–8 cm. broad, pilose on the 2–3 pairs of lateral nerves below ; petiole 2 cm. long ; pedicels 2 cm. long, thinly setose ; bracteoles broadly ovate-elliptic, 3-nerved from the base, setose-pilose ; calyx an undulate rim ; corolla-tube 1·3 cm. long .. .. .. .. .. .. .. .. .. 2. *iodioides*

1. **A. Gilgiana** *Lindau*—F.T.A. 5 : 7. A slender twiner with white flowers ¾ in. long enclosed in broad bracteoles in axillary clusters of 2–4.
S. Nigeria : between Barombi-ba-Mbu and Kake ! Also in French Cameroons, and ? in Uganda. Exsicc.—*Preuss* 481.

2. **A. iodioides** *S. Moore* in Cat. Talb. Nig. Pl. 74. A climbing undershrub, sparsely rusty-hairy, with broad leaves and whitish flowers nearly 1 in. long few in axillary clusters.
S. Nigeria : Oban ! Exsicc.—*Talb.* 388.

## 12. MIMULOPSIS Schweinf.—F.T.A. 5 : 54.

Stems glabrous ; leaves very long-petiolate, ovate-triangular, cordate at the base, 8–14 cm. long, 5·5–8·5 cm. broad, doubly and coarsely dentate ; lateral nerves 6–7-pairs, sparingly pubescent, with very minute rod-like cystoliths on the upper surface ; panicle lax, large, leafy, pubescent ; bracteoles linear ; calyx densely viscid-pilose ; lobes linear ; corolla 2–2·5 cm. long, subregular, glabrous, widely funnel-shaped ; stamens 4 ; fruits beaked, pubescent .. .. .. .. .. *violacea*

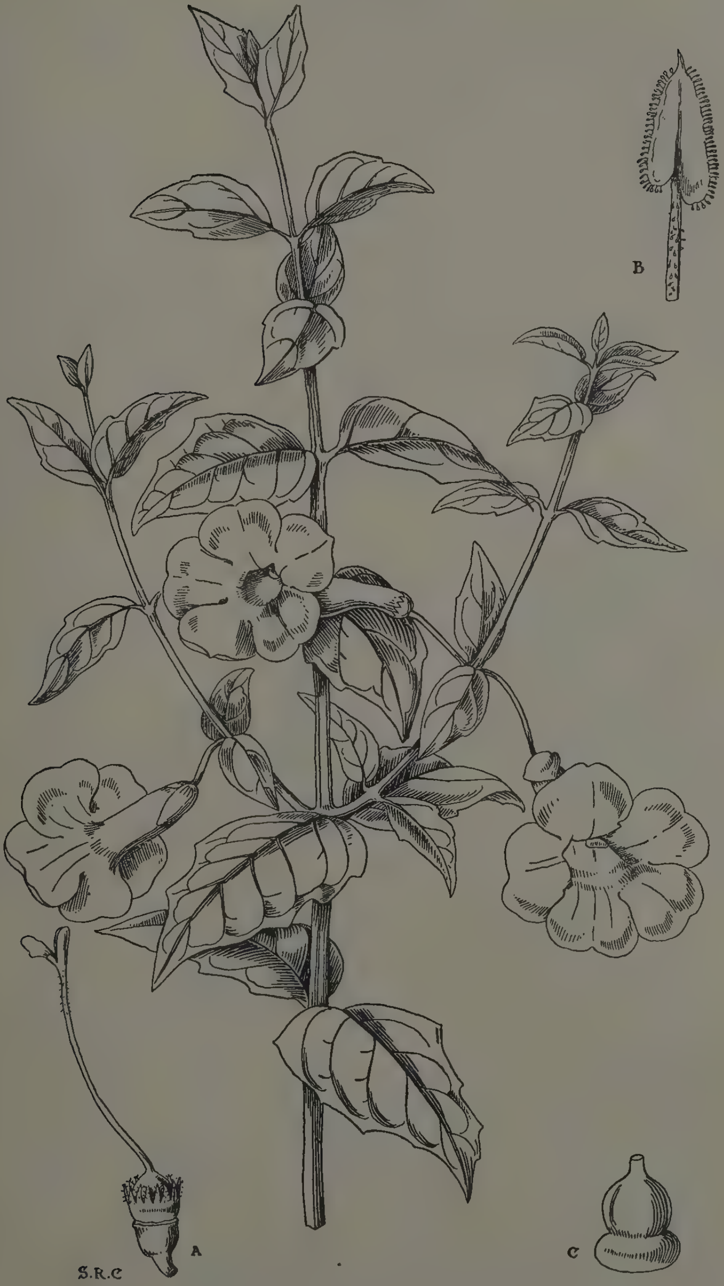

Fig. 264.—Thunbergia erecta *T. Anders.* (Acanthaceae).
A, pistil. B, anther. C, ovary.

**Mimulopsis violacea** *Lindau*—F.T.A. 5 : 55. A coarse herb or undershrub up to 12 ft. high, with 4-angled pithy stems and viscid-hairy inflorescence of lilac or pale violet flowers 1 in. long.
Cameroons Mt., 3,000–7,800 ft., Buea, etc. (Nov., Dec., Jan.) ! Fernando Po, 7,000 ft. (Mar.) ! Exsicc.—*Mann* 1260 ; 1965 ; 2348. *Dunlap* 26 ; 54. *Preuss* 814 ; 1056.

### 13. DYSCHORISTE Nees—F.T.A. 5 : 71.

Flowers (at least the lower ones) in stalked cymes :
Calyx glandular-pubescent, 1·5 cm. long, segments united to the middle, subulate-lanceolate ; corolla 2·5 cm. long, softly pubescent ; leaves oblanceolate, 3–4 cm. long, shortly pubescent on the nerves below .. .. .. 1. *pedicellata*
Calyx not glandular, 1 cm. long, segments united to above the middle, subulate-filiform ; corolla 1–2 cm. long, slightly pubescent ; leaves as above ; fruits 1·3 cm. long .. .. .. .. .. .. .. .. .. .. 2. *radicans*
Flowers in axillary clusters or subsolitary :
Flowers 1–2 in each leaf-axil, shortly pedicellate ; calyx densely glandular-pubescent, 2 cm. long, segments united to the middle, subulate ; corolla 3 cm. long ; leaves oblanceolate, subacute, 4–7 cm. long, up to 2 cm. broad, minutely pubescent 3. *Heudelotiana*
Flowers 3 or more in each leaf-axil, sessile or subsessile ; calyx 6–8 mm. long, covered with cystoliths but not pubescent ; lobes filiform-subulate ; corolla about 8 mm. long ; leaves oblanceolate, up to 10 cm. long and 1·5 cm. broad, glabrous ; fruit 1 cm. long .. .. .. .. .. .. .. .. .. 4. *Perrottetii*

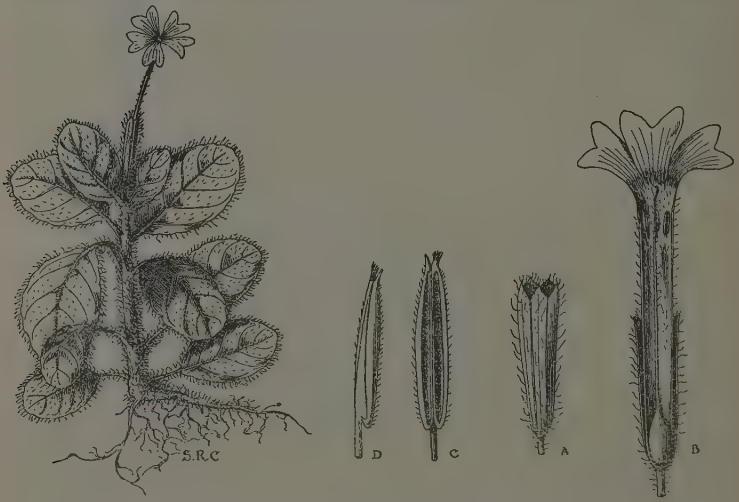

FIG. 265.—PHYSACANTHUS NEMATOSIPHON *Rendle & Britten* (ACANTHACEAE).
A, calyx. B, flower in longitudinal section. C and D, stamens.

1. **Dyschoriste pedicellata** *C.B.Cl.*—F.T.A. 5 : 75. A low shrublet, shortly pubescent, with pinkish or light purplish flowers 1 in. long.
Gambia : north bank (July) ! Also in N. Cameroons. Exsicc.—*Ozanne* 8.

2. **D. radicans** *Nees*—F.T.A. 5 : 73. *Hygrophila chariensis* Lindau ; Chev. Bot. 492. *H. uliginosa* A. Chev. Bot. 493, not of S. Moore. Herbaceous undershrub 1 ft. high, slightly woody at the base, shortly appressed-pubescent, with light-bluish-purple or white flowers ½–¾ in. long.
French Sudan : Koumana, by bush paths (Feb.) ! Tabacco, by a marsh (Jan.) ! N. Nigeria : Bauchi Plateau, Naraguta (Aug.) ! Widely spread in tropical Africa. Exsicc.—*Lely* 483 ; 548. *Chev.* 367.

3. **D. Heudelotiana** *O. Kuntze*—F.T.A. 5 : 76. Half-woody herb or undershrub, shortly pubescent, with purple flowers 1 in. long.
Senegal : Bondou, etc. ! Exsicc.—*Heudelot* 144 ; 190.

4. **D. Perrottetii** *O. Kuntze*—F.T.A. 5 : 72 ; Chev. Bot. 494. Herb or undershrub, branched, 1–3 ft. high, woody below, sometimes decumbent and rooting at the lower nodes, with rather small flowers ⅓ in. long, pink or purplish or white with purple markings.
French Sudan : Niagalétoumanina, in damp spots. Senegal : Dakar and other localities ! Sierra Leone : Scarcies R., Wallia (Jan.) ! Mano (Mar.) ! Njala (Feb.) ! Togo : ? locality ! Segge Brook. N. Nigeria : Borgu ! Kontagora (Dec.) ! Sokoto (Dec.) ! Katagum (Dec.) ! Bauchi Plateau : Naraguta (Jan.) ! S. Nigeria : Lagos Colony ! Ibadan to Abeokuta (Mar.) ! Extends to E. Sudan and Abyssinia. Exsicc.—*Roger* 136. *Barter* 820. *Sc. Elliot* 4534 ; 4634. *Dalz.* 210 ; 299. *Millen* 99. *Baumann* 410. *Schlechter* 12654 ; 13035. (See Appendix).

### 14. **PHYSACANTHUS** Benth.—F.T.A. 5 : 57.

Corolla-lobes widely bilobed, about 7 mm. long; tube 3·5 cm. long, very slender, slightly pubescent towards the top; leaves elliptic, rounded at both ends, 3–5 cm. long, 2–2·5 cm. broad, thinly pilose above, pilose below mainly on the nerves; calyx 1·5 cm. long, pilose .. .. .. .. .. .. .. 1. *nematosiphon*

Corolla-lobes entire or nearly so:

Leaves broadly elliptic, rounded at both ends, 3–5 cm. long, 2–3·5 cm. broad, otherwise as above; calyx 2·5 cm. long, deeply lobed, shortly pubescent; corolla-tube 5 cm. long, villous at the mouth; lobes broadly obovate, 1·3 cm. long, 1 cm. broad 2. *Talbotii*

Leaves broadly oblanceolate, rounded at the apex, narrowed to the base, 8–14 cm. long, 3–5 cm. broad, thinly pilose on both surfaces; petiole 1 cm. long, densely pilose; flowers up to 4 in each inflorescence; calyx 2 cm. long, very slightly pubescent; corolla-tube 4 cm. long, bent and pubescent towards the apex; lobes obovate, 1 cm. long .. .. .. .. .. .. .. .. 3. *inflatus*

1. **Physacanthus nematosiphon** *Rendle & Britten* in Journ. Bot. 47 : 378. *Haselhoffia nematosiphon* Lindau. Creeping herb rooting at the nodes, densely hairy, the leaves with few nerves prominent below, and usually solitary narrow-tubular white flowers 1½ in. long.
Liberia: Bumbumi, Msala (Nov.)! Dukwia R. (Oct., Nov.)! Ivory Coast: Cavally Basin, Mt. Copé 1,100 ft. (July)! Middle Sassandra and Middle Cavally (June-July)! Exsicc.—*Chev.* 19255; 19670. *G. P. Cooper* 17. *Linder* 1339.
2. **P. Talbotii** *S. Moore* in Cat. Talb. Nig. Pl. 75. A pubescent creeping herb like the last, with slender-tubed solitary flowers 2 in. long, blue-violet with darker throat.
S. Nigeria: Oban! Exsicc.—*Talb.* 972.
3. **P. inflatus** *C.B.Cl.*—F.T.A. 5 : 57; Chev. Bot. 495. Stems half-woody, erect, 1–2 ft. high, the leaves sometimes marbled with white or purple-tinged, with white or pale blue-violet flowers.
Ivory Coast: several localities in forest! S. Nigeria: Eket. Also in French Cameroons and Sierra del Crystal. Exsicc.—*Talb.* 3301. *Chev.* 19255 bis, etc.

### 15. **BRILLANTAISIA** Beauv.—F.T.A. 5 : 37.

Leaves lanceolate, with ascending lateral nerves, gradually acuminate, acute at the base, 7–10 cm. long, 1–2·5 cm. broad, with very numerous rod-like cystoliths below, serrulate; petiole about 1 cm. long; panicle small, few-flowered, about 10 cm. long; calyx-segments unequal, the longest 6 mm. long, glandular; corolla 2 cm. long 1. *Talbotii*

Leaves more or less broadly ovate:

Leaves entire or very obscurely crenulate:

Leaves rounded at the base, variable in size, broadly ovate, acuminate, pilose on both surfaces, with conspicuous rod-like cystoliths on the upper surface; petiole not or only slightly winged, pilose; panicle lax; calyx-segments linear, 8–10 mm. long, with a few stipitate glands; corolla about 3 cm. long, the tube about ⅓ as long as the lips; fruit glabrous, linear, 3–3·5 cm. long, many-seeded .. .. 2. *Lamium*

Leaves broadly rounded-cuneate into the winged petiole, about 16 cm. long, 7–8 cm. broad, otherwise as above; inflorescence spike-like; calyx-segments filiform, plumose .. .. .. .. .. .. .. 3. *madagascariensis*

Leaves toothed, mostly cuneate at the base into the winged petiole:

Petiole very shortly or scarcely winged towards the apex, up to 10 cm. long; leaf-blade broadly ovate, rounded or truncate at the base, shortly acuminate, 5–15 cm. long, up to 10 cm. broad, very thin, with numerous rod-like cystoliths prominent on the upper surface, obtusely repand-dentate; panicle many-flowered; calyx-segments 1 cm. long, glandular-pubescent; corolla 2·5 cm. long; fruit 2 cm. long, very shortly pubescent .. .. .. .. .. .. .. 4. *Vogeliana*

Petiole more or less-winged in the upper half, the leaf-blade cuneate at the base:

Leaf-blade gradually narrowed into the petiole:

Branches of inflorescence markedly zigzag; petiole winged to the base; calyx-segments linear-spathulate .. .. .. .. .. .. 5. *patula*

Branches of inflorescence dichotomous; petiole not winged to the base; calyx-segments subfiliform .. .. .. .. .. .. 6. *owariensis*

Leaf-blade abruptly narrowed into the winged petiole, rounded or truncate at the base:

Petiole-tomentose or long-pilose:

Petiole broadly winged, long-pilose, wings dentate; blade very broadly ovate, abruptly acuminate, truncate or cordate at the base, about 15–18 cm. long and 12 cm. broad, coarsely serrate, pilose on both surfaces; corolla 3–3·5 cm. long 7. *leonensis*

Petiole not winged, tomentose, about 2·5 cm. long; blade broadly ovate, broadly acuminate, rounded at the base, obtusely dentate, 8–15 cm. long, 5–10 cm. broad, shortly setulose, especially on the nerves below; calyx segments linear, densely glandular-pilose, up to 1·5 cm. long; corolla 4 cm. long 8. *bauchiensis*

Petiole glabrous or nearly so; wing entire or toothed; blade broadly ovate, acuminate, averaging about 18 cm. long and 12 cm. broad, coarsely serrate, with numerous lateral nerves; calyx-segments about 1 cm. long; corolla about 3–4 cm. long .. .. .. .. .. .. .. .. 9. *nitens*

1. **Brillantaisia Talbotii** *S. Moore* in Cat. Talb. Nig. Pl. 75. A rather scrambling or suberect herb, the stems soon glabrous, the inflorescence glandular-pubescent, with blue flowers ¾ in. or more long.

S. Nigeria: Oban! Exsicc.—*Talb.* 2000.

2. **B. Lamium** *Benth.*—F.T.A. 5: 38; Stapf 638; Holl. 3: 515; Chev. Bot. 493. A coarse herb, erect branched 2–4 ft. high, more or less pilose at first, with blue- or violet-purple flowers 1–1¼ in. long in a glandular-pubescent panicle.

In damp shady places, from Sierra Leone to N. and S. Nigeria! Extends to Cameroons, the Biafra Islands, Congo and Uganda. Exsicc.—*T. Vogel* 17. *Ansell.* *Barter* 103. *Irving.* *Burton* and *Cameron.* *Johnston* 44. *Millen* 7. *Johnson* 965. *Whyte.* *Dawodu* 265. *Lane-Poole* 392. *Dalz.* 149; 994. *Yates* 35. *Lely* 469. *Dent Young* 194. *Hepburn* 71. *Baumann* 67.

3. **B. madagascariensis** *T. Anders.*—F.T.A. 5: 43; Chev. Bot. 493. Like the last but with flowers 1–1½ in. long in a spike with glandular hairs.

French Guinea: Farana, Niger sources at Timbikounda (Jan.)! Also in E. Africa and Madagascar. Exsicc.—*Chev.* 20607.

4. **B. Vogeliana** *Benth.*—F.T.A. 5: 40. Habit of the last and with similar violet-purple flowers about 1 in. long.

S. Nigeria: Oban! Victoria (Oct.)! Barombi (June)! Cameroons Mt., Buea (Sept., Oct.)! Fernando Po (Nov., Dec.)! Also in French Cameroons and St. Thomas Island. Exsicc.—*T. Vogel* 179. *Mann* 36. *Talb.* (no number). *Maitland* 110; 757. *Preuss* 320; 998.

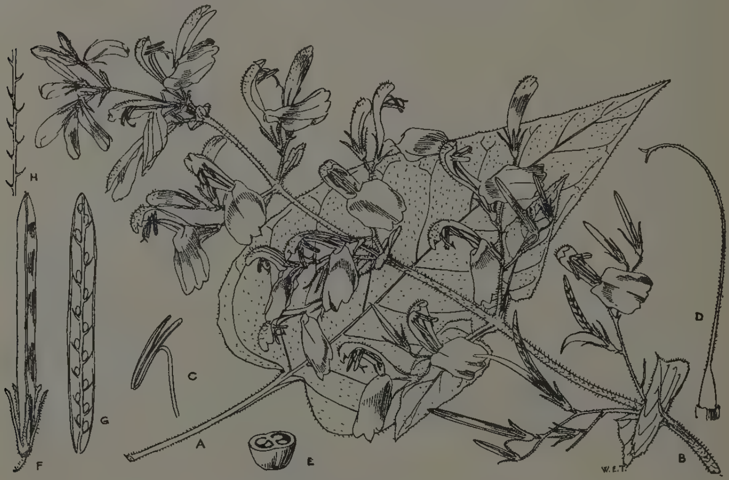

FIG. 266.—BRILLANTAISIA LAMIUM *Benth.* (ACANTHACEAE).

A, leaf. B, inflorescence. C, anther. D, pistil. E, cross-section of ovary. F, fruit. G, one valve of fruit. H, axis of fruit.

5. **B. patula** *T. Anders.*—F.T.A. 5: 41. A stout plant up to 6–10 ft. high, sometimes several inches in circumference at base of stem, with comparatively large violet-purple flowers, the upper lip yellowish and purple-spotted; cultivated in native gardens.

N. Nigeria: Lokoja (Mar.)! S. Nigeria: Lagos (Oct.)! In Cameroons, extending to Angola and Uganda. Exsicc.—*Shaw* 26. *Dalz.* 1139.

6. **B. owariensis** *Beauv.* Fl. Owar. 2: 68, t. 100, fig. 2—F.T.A. 5: 40. Erect up to 10–12 ft. high, stems glandular-pubescent at first later glabrous, with purple flowers 1–1½ in. long.

S. Nigeria: Benin. Awka! Cameroons Mt.: Buea, etc., 3,000–3,500 ft. (Dec.–Feb.)! Exsicc.—*Beauvois.* *Mann* 1959. *Dalz.* 8186. *N. W. Thomas* 102; 114. *Dunlap* 25.

7. **B. leonensis** *Burkill*—F.T.A. 5: 41; Chev. Bot. 493. Stems 1–4 ft. high, glandular-pubescent becoming glabrous, with purple flowers 1–1½ in. long.

French Guinea: Kindia (Mar.)! Ditinn, waterfall, 2,500 ft. (Apr.)! Farana, Forékaria (Jan.)! Sierra Leone: Regent and neighbourhood (Dec.)! Ivory Coast: Morénou, between Anoumaba and Sahoua (Nov.)! Exsicc.—*Winwood Reade.* *Sc. Elliot* 3990A.

8. **B. bauchiensis** *Hutch. & J. M. Dalz.* in Kew Bull. 1931: ined. Herbaceous perennial up to 6–8 ft. high, densely tomentose and glandular-pubescent, with blue-purple flowers nearly 2 in. long.

N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft. (Feb.)! Naraguta (Jan.)! Exsicc.—*Dent Young* 195. *Lely* P. 129.

9. **B. nitens** *Lindau*—F.T.A. 5: 41. *B. salviiflora* Lindau. Stems up to 9 ft. high, glandular-pubescent becoming glabrous, with blue-purple flowers 1½–2 in. long.

Sierra Leone: several localities! Gold Coast: common in damp forest places! Togo: Misahöhe! N. Nigeria: Bauchi Plateau, 4,000 ft. (Dec.)! S. Nigeria: Benin! Ubulubu! Ogwashi (Nov.)! Oban! Cameroons Mt.: above Buea, 3,000–6,000 ft.! Mayuko (Feb.)! Also in French Cameroons. Exsicc.—*Garrett.* *Cummins* 245. *Dennett* 34. *Smythe* 240. *Burbridge* 473. *Chipp* 560. *Dalz.* 148; 8233. *Fishlock* 55. *Lamb* 66. *Talb.* 993. *Preuss* 847. *Mildbr.* 7353. (See Appendix).

### 16. **LANKESTERIA** Lindl.—F.T.A. 5 : 69.

Bracts ovate :

Calyx 5 mm. long, not visible in the spike ; bracts nervose, 2–3 cm. long ; leaves obovate-oblanceolate, acuminate, 10–20 cm. long, 4–7 cm. broad, with small hair-like cystoliths conspicuous on the upper surface :

Corolla-tube about 3·5–5 cm. long, slender, shortly pubescent ; bracts glabrous except the margin .. .. .. .. .. .. .. .. .. 1. *elegans*

Corolla-tube 1·5–3 cm. long ; bracts pubescent .. .. .. .. 2. *brevior*

Calyx over 1 cm. long, conspicuous amongst the bracts ; bracts as above but more obovate ; leaves more or less as above ; corolla-tube about 2·5 cm. long, shortly pilose .. .. .. .. .. .. .. .. .. .. 3. *Barteri*

Bracts linear, densely ciliate and glandular :

Inflorescence spicate, longer than broad ; branchlets densely pilose ; leaves obovate-oblanceolate, 7–12 cm. long, 3–5 cm. broad, hardly acuminate, narrowed from well above the middle to the base, with small hair-like cystoliths on the upper surface ; calyx-segments 1·5 cm. long ; corolla a little longer than the calyx 4. *thyrsoidea*

Inflorescence depressed-globose ; branchlets, leaves, etc., as above, but leaves acuminate ; calyx 2 cm. long ; corolla considerably longer than the calyx ; fruit 1 cm. long, glabrous.. .. .. .. .. .. .. .. .. 5. *hispida*

1. **Lankesteria elegans** *T. Anders.*—F.T.A. 5 : 70 ; Chev. Bot. 495. Undershrub up to 4 ft. high in forest undergrowth, etc., with spikes 2–7 in. long of orange- or pinkish-tinged slender tubular flowers 1½ in. long enclosed in broad smooth but ciliate bracts.

Sierra Leone : Kambui Reserve (Feb.) ! Ivory Coast : Bouroukrou (Dec.–Jan.) ! Cavally Basin, Tabou to Bériby (Aug.). S. Nigeria : Ajilite (Jan.) ! Lagos Colony, Awta, etc. ! Oban ! Cross R. district (Dec.) ! Tiko (Jan.) ! Victoria ! Extends to Congo, S.E. Sudan and Uganda. Exsicc.—*Moloney* 6. *Rowland. Millen* 103 ; 120. *Holl.* 190. *Lane-Poole* 339. *Dunlap* 164. *Preuss* 1362.

2. **L. brevior** *C.B.Cl.* in Journ. Linn. Soc. 37 : 110 ; Stapf 640. Habit of the last but flowers pure white with yellow throat, corolla-tube usually considerably shorter, and bracts smaller, pubescent and often turning bronze-tinged when old.

Sierra Leone : fairly common by bush paths ! Liberia : Monrovia ! Kakatown ! Dukwia R. (Feb., Oct., Nov.) ! Gold Coast : Axim ! Assin Yan Kumasi ! Akim, Kibbi and Tumfa Hills (Dec.) ! Ashanti, Bompata (Dec.) ! Amentia, amongst Cocoa ! S. Nigeria : Tiko (Jan.) ! Johann-Albrechtshöhe ! Exsicc.—*Whyte. Burton* and *Cameron. Cummins* 50 ; 199. *Johnson* 257 ; 261. *Lane-Poole* 162. *Dunlap* 173. *G. P. Cooper* 44. *Staudt* 538. (See Appendix).

3. **L. Barteri** *Hook. f.* Bot. Mag. t. 5533 ; F.T.A. 5 : 70. Undershrub 2–4 ft. high, pubescent, with slender tubular flowers 1½ in. long, turning deep orange or reddish, in dense spike-like panicles 2–4 in. long.

S. Nigeria : Abeokuta, in forest ! Calabar (Feb., Apr.) ! Cross R. ! Oban ! Also in Cameroons. Exsicc.—*Barter* 3381. *Mann* 2313. *Thomson* 20. *Holl.* 112. *Johnston.*

4. **L. thyrsoidea** *S. Moore* in Cat. Talb. Nig. Pl. 77. A hairy undershrub, 1 or more ft. high, with slender flowers 1–1¼ in. long, white, lilac or pinkish with yellow throat in a dense glandular-hairy narrow panicle.

S. Nigeria : Oban ! Calabar district, Owhy (Dec.) ! Cross R. (Dec.) ! Exsicc.—*Talb.* 1646. *Holl.* 180 ; 229.

5. **L. hispida** *T. Anders.* in Journ. Linn. Soc. 7 : 32. *Justicia hispida* Willd. *L. parviflora* Lindl. in Bot. Reg. t. 12—F.T.A. 5 : 70 ; Chev. Bot. 495. Pubescent undershrub 1–2 ft. high (sometimes decumbent) in forest undergrowth, with slender tubular flowers 1¼ in. long, lemon-yellow or pure white but turning yellow, in dense heads.

Sierra Leone : various localities (Jan.–Mar.) ! Also in Cameroons. Exsicc.—*Don. Barter* (no number). *Sc. Elliot* 4452. *Lane-Poole* 163. *N. W. Thomas* 7471 ; 7835. *Dalz.* 972. *Dawe* 477.

### 17. **THOMANDERSIA** Baill.—F.T.A. 5 : 119.

A shrub ; branches terete ; glabrous ; leaves markedly anisophyllous, the larger oblong-elliptic, subcaudate-acuminate, unequal-sided at the base, 8–15 cm. long, 3–6·5 cm. broad, with 3–5 pairs of lateral nerves, pubescent in their axils ; petiole up to 4 cm. long ; smaller leaves ovate ; racemes axillary, very slender, up to 30 cm. long ; calyx leathery, 2·5 mm. long ; corolla 1·5 cm. long ; stamens 4 ; fruit ovate-orbicular, 1·5 cm. long .. .. .. .. .. .. .. .. .. *laurifolia*

**T. laurifolia** *Baill.*—F.T.A. 5 : 120 ; Hook. Ic. Pl. t. 1209 (as *Scytanthus laurifolius* T. Ands.). A nearly glabrous shrub up to 15 ft. high with shining foliage, and long narrow racemes 6–12 in. long of flowers ½ in. long, white or red and with red-purple markings.

S. Nigeria : Calabar R. (Feb.) ! Adiabo (Mar.) ! Oban ! Barombi : Cameroons R. (Jan.) ! Extends to Congo. Exsicc.—*Mann* 718 ; 2207 ; 2321. *Holl.* 87.

### 18. **LEPIDAGATHIS** Willd.—F.T.A. 5 : 120.

Inflorescence terminal, up to 5 cm. long ; bracts broadly lanceolate, long-bristle-pointed, strongly nerved, about 7 mm. long ; leaves lanceolate to narrowly oblanceolate, slightly pubescent on the nerves below ; corolla nearly 1 cm. long ; adaxial stamens 2- or 1-celled ; fruit shorter than the bracts .. .. .. 1. *laguroidea*

Inflorescence lateral, sometimes near the ground :

* Inflorescence not confined to the base of the plant

Inflorescence oblong-cylindric, longer than broad :

Leaves glabrous, linear, 4–5 cm. long, 1-nerved ; inflorescence 3 cm. long, 1·5 cm. diam. ; bracts ovate, long-subulate-acuminate, about 1 cm. long, villous 2. *sericea*

Leaves pubescent :

Stems softly villous ; leaves linear, prominently 3-nerved, appressed-villous-pilose, 6–7 cm. long; inflorescence sessile, 3 cm. long; bracts lanceolate, with very long bristly tips .. .. .. .. .. .. .. 3. *Medusae*

Stems thinly pubescent; leaves linear, 3-nerved, appressed-pubescent; inflorescences numerous, curved, about 4 cm. long; bracts long-pilose, with slender tips 4. *Heudelotiana*

Inflorescence globose or subglobose, about as broad as long:

Leaves acicular:

Inner bracts with a terete subulate acumen, outer ovate-lanceolate, thin, pubescent; inflorescences densely crowded; leaves glabrous .. .. 5. *fimbriata*

Inner bracts with a flat acumen, outer ovate-lanceolate, glabrous outside, up to 1·3 cm. long; inflorescences in a sessile cluster; leaves glabrous 6. *acicularis*

Leaves not acicular:

Bracts villous; leaves linear-lanceolate, acute, up to 10 cm. long and 1·5 cm. long, scabrid to softly pubescent; inflorescences in a dense sessile cluster up to 6 cm. diam.; bracts villous-plumose, with subulate points .. .. 7. *mollis*

Bracts glabrous or nearly so, ovate, with long subulate points, up to 1·5 cm. long; leaves linear, very acute, up to 17 cm. long, strongly 3-nerved, with prominent linear cystoliths spreading from the midrib at right angles .. .. 8. *anobrya*

** Inflorescence confined to the base of the plant:

Rootstock with both inflorescences and erect slender sterile stems and also spreading or prostrate sterile branches clothed with overlapping spine-pointed scales in the lower part:

Inflorescences 1–3 together, 1·5–3 cm. long, about 2 cm. in diam., truncate at the apex; the outer bracts ½–1 cm. broad, truncate with a rigid point; bracteoles and sepals oblong, truncate and tomenose at the tip; leaves of the erect stems ericoid, 4–10 mm. long, glabrous .. .. .. .. 9. *Pobeguinii*

Inflorescences often proliferous, forming a globose cluster; bracteoles and sepals with a long linear ciliate tip; leaves of the erect stems 1 cm. long 10. *Chevalieri*

Rootstock with erect stems only, slender and sterile above the inflorescence and with scale-like leaves below it; inflorescence dense, resembling that of *L. Chevalieri*; bracts concave, ovate, acute; bracteoles and sepals narrow, very acute, ciliate; leaves sometimes several cm. long .. .. .. .. 11. *dahomensis*

1. **Lepidagathis laguroidea** *T. Anders.*—F.T.A. 5:128; Chev. Bot. 498. *L. hyssopifolia* T. Anders. *L. alopecuroidea* R.Br. Decumbent slender branching herb, woody below, rooting at the lower nodes, with small pink or purplish flowers ⅓ in. long in short dense almost bristly spikes.
French Sudan: Oualia, near Kita! French Guinea: Farana (Jan.)! Forekaria (Jan.)! Sierra Leone: fairly common! Ivory Coast: several localities! Gold Coast: Accra! Axim! Togo. N. Nigeria: Borgu, Oly River! Bauchi Plateau, Naraguta! S. Nigeria: Oban! Victoria. Extends to E. Sudan. Exsicc.—*Don.* *T. Vogel* (no number). *Barter* 746. *Burton* and *Cameron*. *Sc. Elliot* 3902; 4376; 4533; 4744. *Lely* 36. *Chev.* 20443; 20528.
2. **L. sericea** *R. Benoist* in Lecomte, Not. Syst. 2:154.—Chev. Bot. 499. Erect woody undershrub with narrow leaves and pink-purple flowers in somewhat 4-sided spikes ¾–1½ in. long.
French Sudan: Balani! Senegal: Galam; Bakel and district. French Guinea: Sokotoro (Dec.)! Timbo, on laterite plateau; Kadé. Exsicc.—*Pobéguin* 1458.
3. **L. Medusae** *S. Moore*—F.T.A. 5:127. *L. sericea* var. *hirta* R. Benoist—Chev. Bot. 499. A rather stout-branched woody undershrub, with woolly flower-spikes 1–1½ in. long, often 2 together, with tail-tips of the bracts becoming deflexed.
French Sudan: Koulikoro (Oct.)! Also in E. Sudan. Exsicc.—*Chev.* 2773; 2774.
4. **L. Heudelotiana** *Nees*—F.T.A. 5:126; Chev. Bot. 498. Erect woody undershrub with narrow leaves and whitish-hairy flower-spikes 1–1½ in. long.
Senegal! Gambia! French Guinea: Futa-Jallon, several localities! Exsicc.—*Heudelot* 666. *Hayes* 574. (See Appendix).
5. **L. fimbriata** *C.B.Cl.*—F.T.A. 5:125; Chev. Bot. 498. A slender half-woody herb, nearly glabrous, with very narrow leaves and short dense inflorescences 1–1½ in. in diameter.
French Sudan: Gourma, from Fada to Koupéla! Senegal! French Guinea: Futa-Jallon, between Timbo and Ditinn (Sept.)! Exsicc.—*Heudelot* 679.
6. **L. acicularis** *Turrill* in Kew Bull. 1912:361. Wiry, terete, glabrous stems, with very narrow leaves 1–2 in. long, and yellow flowers ½–⅔ in. long in short congested inflorescences either basal or axillary.
N. Nigeria: Lokoja, top of Patti (Oct.)! Exsicc.—*Dalz.* 139.
7. **L. mollis** *T. Anders.*—F.T.A. 5:126. A coarse woody herb, 1–2 ft. high, with ribbed pubescent stems, and yellow purple-spotted flowers ¾ in. long in very dense heads 1–2½ in. in diameter either axillary or basal.
N. Nigeria: Nupe, on stony hills! Lokoja! Ilorin, Aguji (Oct.)! Zungeru (Aug.)! Yola (Sept.)! Bauchi Plateau: plains between Hepham and Ropp, 4,600 ft. (July)! Vom! Also in Uganda. Exsicc.—*Barter* 955. *Baikie*. *Dalz.* 188; 303. *Thornton*. *Lely* 377. *Dent Young* 200.
8. **L. anobrya** *Nees*—F.T.A. 5:124; Chev. Bot. 498. Stems slender glabrous, angled, with long narrow leaves and dense flower-heads 1–1½ in. in diameter, mostly basal or with one at an upper node.
French Sudan: Koulikoro (Oct.)! Senegal! Exsicc.—*Heudelot* 204. *Chev.* 3326.
9. **L. Pobeguinii** *Hua* in Bull. Soc. Bot. Fr. 50:576; Chev. Bot. 499; Journ. Linn. Soc. 30, t. 8. A heath-like plant, 12–18 in. high, with a woody rootstock; flowers yellowish.
French Sudan: Dougoura! French Guinea: Kora R.! Beyla! Futa-Jallon, common and covering places on laterite plateaux! Farana, between Sulimania and the Niger sources (Mar.)! Exsicc.—*Pobéguin* 209. *Sc. Elliot* 5386. *Chev.* 20879.
10. **L. Chevalieri** *R. Benoist* in Lecomte Notul. Syst. 2:20; Chev. Bot. 498. Habit of the last.
French Sudan: Diaragouéla, on dry laterite plateaux (Feb.)! French Guinea: Coniaguin and Boussoura (Feb.)! Exsicc.—*Chev.* 481. *Pobeguin* 2145.
11. **L. dahomensis** *R. Benoist* in Bull. Soc. Bot. Fr., Mém. 8d:190; Chev. Bot. 498. Like the last but without the lateral leaf-scaled shoots.
Dahomey: Atacora Mts., Upper Pendjari valley, between Farfa and Toukountouna, 1,350–1,650 ft (June)! Exsicc.—*Chev.* 24072.

### 19. **TALBOTIA** S. Moore in Cat. Talb. Nig. Pl. 80, t. 11, figs. 1–6.

Herb with procumbent stems rooting at the nodes ; branches pubescent ; leaves ovate-elliptic, rounded at both ends, 3–5 cm. long, 2·5–3·5 cm. broad, densely pubescent below ; petiole pubescent ; spikes axillary, pedunculate, 2–4 cm. long ; bracts obovate, 1 cm. long ; bracteoles spathulate-oblanceolate, 8–10 mm. long ; corolla-tube 1 cm. long, 2-lipped, the posterior lip bidentate, the anterior lip 3-lobed ; stamens 4, the anthers of the 2 shorter ones 1-celled .. .. .. .. *radicans*

**T. radicans** *S. Moore* l.c.
S. Nigeria : Oban, Ako-Aking Road ! Exsicc.—*Talb.* 971.

### 20. **ASYSTASIA** Blume—F.T.A. 5 : 130.

Leaves very large, 20–30 cm. long, 5–12 cm. broad, elongate-obovate, caudate-acuminate, acute at the base, with 7–9 pairs of prominent lateral nerves, glabrous ; inflorescence spike-like, with rather distant clusters of flowers, up to 30 cm. long ; calyx-segments subulate, about 4 mm. long ; corolla 3·5 cm. long, blackish when dry ; style glabrous, thread-like and persistent .. .. .. .. 1. *macrophylla*
Leaves much smaller than above, up to 15 cm. long and 6 cm. broad :
 Corolla about 5 cm. long :
  Corolla narrowly cylindric in the lower third, rather suddenly and narrowly bell-shaped in the upper two-thirds ; calyx-segments about 1 cm. long ; leaves oblong to obovate-elliptic, acuminate, acute at the base, 8–16 cm. long, 3·5–5·5 cm. broad, glabrous .. .. .. .. .. .. .. .. .. 2. *scandens*
  Corolla gradually widened to near the top ; calyx-segments linear, 7 mm. long, glandular-puberulous ; leaves narrowly elliptic, gradually acuminate, acute at the base, 8–15 cm. long, 3·5–5·5 cm. broad, glabrous .. .. 3. *Vogeliana*
 Corolla up to 3 cm. long :
  Calyx-segments 1 cm. long, broadly linear, glabrous ; leaves ovate to oblong-elliptic, broadly acuminate, rounded to cuneate at the base, 5–7 cm. long, 2·5–4 cm. broad, glabrous or nearly so ; corolla glabrous outside.. .. .. .. 4. *calycina*
  Calyx-segments as above but ciliate ; other characters more or less as above 5. *Buettneri*
  Calyx-segments 5 mm. long or less, subulate :
   Calyx-segments 5 mm. long ; leaves ovate or ovate-triangular, broadly pointed, rounded or truncate at the base, 4–7 cm. long, 2·5–3·5 cm. broad, pubescent on the nerves ; petiole pubescent ; corolla-tube 1·5 cm. long or more, shortly pubescent with descending hairs ; fruit 2 cm. long, softly puberulous 6. *gangetica*
   Calyx-segments 1–2 mm. long ; leaves oblong- to obovate-elliptic, obtusely acuminate, bluntly cuneate at the base, 8–15 cm. long, 4–6 cm. broad, subglabrous on the nerves below, corolla-tube 6–8 mm. long, minutely puberulous ; fruit not known .. .. .. .. .. .. .. .. 7. *Lindauiana*

1. **Asystasia macrophylla** *Lindau*—F.T.A. 5 : 134. A soft-wooded shrub up to 10 ft. high, with strong spikes of white or purple-tinged flowers 1½ in. long.
S. Nigeria : Oban ! Cameroons R. (Jan.) ! Johann-Albrechtshöhe ! Fernando Po (Dec.) ! Extends to Gabon. Exsicc.—*Mann* 13 ; 2197. *Talb.* 2010.
2. **A. scandens** *Hook.*—F.T.A. 5 : 133 ; Stapf 642. A straggling undershrub, sometimes low and subherbaceous, with pale purple or white and purple flowers 2 in. long in a terminal somewhat viscous inflorescence about 3 in. long.
Sierra Leone : common in forest by streams, etc. (Dec.–Feb.) ! Liberia : Kakatown ! Exsicc.—*Don. Barter* (no number). *Sc. Elliot* 4164 ; 4919 ; 5012. *Whyte. Smythe* 253. *Lane-Poole* 176. *Dalz.* 949 ; 1005. *N. W. Thomas* 7652.
3. **A. Vogeliana** *Benth.*—F.T.A. 5 : 133 ; Stapf 642 ; Chev. Bot. 499. *A. longituba* Lindau. A weak more or less straggling undershrub, with tubular pale lilac or bluish flowers 2–2½ in. long in a terminal compound lax inflorescence.
Sierra Leone : Malema (Nov.) ! Liberia : Kakatown. Ivory Coast : Makougnié ; Agniéby Valley, Guébo, in forest ; Attié, between Potou lagoon and Alépé. Gold Coast : Assin Yan Kumasi ! Akim Hills (Dec.) ! S. Nigeria : Lagos Colony ! Angiama ! Eket ! Degema ! Oban ! Cross R. (Dec.) ! Cameroons Mt., 3,000 ft. (Dec.) ! Fernando Po (Dec.) ! Also in Cameroons and Uganda. Exsicc.—*T. Vogel* 211. *Barter* 2096. *Mann* 47 ; 1955. *Irving. Rowland. Cummins* 79. *Johnson* 265. *Whyte. Holl.* 230. *Talb.* 3068 ; 3653. *Deighton* 454. *Preuss* 1363.
4. **A. calycina** *Benth.* in Hook. Niger Fl. 478. *A. dryadum* S. Moore. *A. coromandeliana* C.B.Cl.—F.T.A. 5 : 131, in small part, not of Nees. Herb, erect or half-straggling, 1–2 ft. or more high, slightly pubescent, with tubular flowers inflated above, ¾–1 in. or more long, usually white with red-purple markings, in one-sided racemes.
Sierra Leone : various localities ! Liberia : Grand Bassa (July) ! Monrovia ! Gold Coast : Accra (Jan.) ! S. Nigeria : Olokemeji (Oct.) ! Aguku ! Eket, road to Oron ! Oban ! Exsicc.—*T. Vogel* 87. *Sc. Elliot* 4990. *Whyte. Foster. Dalz.* 152. *Talb.* 991 ; 991A ; 3114.
5. **A. Buettneri** *Lindau*—F.T.A. 5 : 132 ; Chev. Bot. 499. Herb with larger leaves than the last, sometimes rather hairy.
French Guinea : Kouria. Togo : Depongo ! Misahöhe (Nov.) ! Exsicc.—*Buettner* 260. *Mildbraed* 7321.
6. **A. gangetica** *T. Anders* in Thwaites Enum. Pl. Zeyl. 235 ; Chev. Bot. 499. *Justicia gangetica* Linn. *A. coromandeliana* Nees—F.T.A. 5 : 131, in greater part ; Stapf 640 ; Chev. Bot. 499. Herb, 1–4 ft. high, very similar to *A. calycina*.
A common weed in tropical Africa and Asia. Exsicc.—*T. Vogel* 9 ; 56. *Skues. Barter* (no number). *Mann* 265 ; 510. *Sc. Elliot* 3895. *Whyte. Talb.* 1508. *Preuss* 1115. *Warnecke* 272. (See Appendix).
7. **A. Lindauiana** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. *Filetia africana*—F.T.A. 5 : 136. Herbaceous undershrub 2–4 ft. high, with flowers less than ½ in. long in a very narrow panicle.
S. Nigeria : Oban ! Also in Cameroons, French Congo and Gabon. Exsicc.—*Talb.* 380 ; 985.

### 21. **SCLEROCHITON** Harv.—F.T.A. 5 : 109.

Calyx-segments subequal, one much broader than the other, broadly lanceolate, about 4 cm. long and 1·3 cm. broad, many-nerved, obtuse, the others very acutely pointed; fruit 2·5 cm. long; leaves oblong-elliptic, broadly acuminate, 15–20 cm. long, 5–8 cm. broad, very thin, glabrous .. .. .. .. .. .. .. 1. *Preussii*

Calyx-segments subequal in length, one somewhat broader, narrowly subulate-lanceolate, 2·5 cm. long; fruits 1·5 cm. long; leaves ovate to lanceolate, broadly acuminate, 4–12 cm. long, up to 5 cm. broad, subcoriaceous, pubescent on the midrib below; corolla 3 cm. long, limb of 5 united segments in one plane, lobes about 5 mm. long; stamens 4; anthers 1-celled, pubescent .. .. .. .. .. 2. *Vogelii*

1. **S. Preussii** *C.B.Cl.*—F.T.A. 5 : 110. A nearly glabrous shrub with fairly large leaves and short flower-spikes with shining striate papery bracts and calyx.
Cameroons Mt.: north-west from Buea (Oct.) ! Exsicc.—*Preuss* 1073.

2. **S. Vogelii** *T. Ands.*—F.T.A. 3 : 111. A nearly glabrous shrub with dark smooth foliage and white flowers (turning red-brown in drying) about 1 in. long in abbreviated spikes with striate dry calyx and bracts.
Sierra Leone: Bumbuna, on rocks by the river (Aug.) ! Makump (July) ! Liberia: Cape Palmas (July) ! Gold Coast: Asientien, near the beach (July) ! Exsicc.—*T. Vogel* 54. *Ansell*. *Chipp* 287. *N. W. Thomas* 930; 1278. *Deighton* 1202.

### 22. **CROSSANDRA** Salisb.—F.T.A. 5 : 112.

Short herbs:

Leaves gradually attenuated into the short petiole, oblanceolate, rounded-triangular at the apex, up to 25 cm. long and 6 cm. broad, puberulous below; spikes with a hairy peduncle, broadly oblong-cylindric, with densely overlapping very broadly ovate spinose-dentate pubescent bracts; corolla-tube slender, about 3·5 cm. long, softly pubescent .. .. .. .. .. .. .. .. 1. *flava*

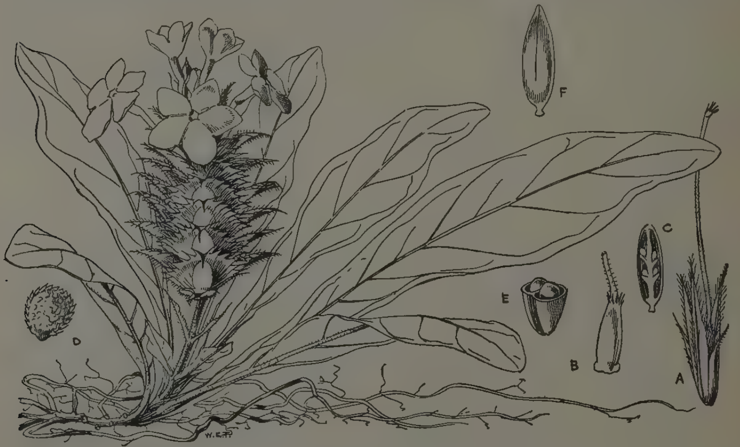

FIG. 267.—CROSSANDRA FLAVA *Hook.* (ACANTHACEAE).

A, calyx and style. B, ovary. C, longitudinal section of ovary. D, seed. E, cross-section of fruit. F, fruit.

Leaves oblong, rounded at the base, 3–6 cm. long, 1·5–2·5 cm. broad, setulose above, pubescent on the nerves below; petiole 8 mm. long, pubescent; spikes small and 2–3-flowered .. .. .. .. .. .. .. .. 2. *Buntingii*

Leaves rounded or subcordate at the base, obovate-elliptic, rounded at the apex, 6–12 cm. long, 3–6 cm. broad, pubescent on the nerves below; spikes sessile, very narrowly cylindric, up to 12 cm. long, with ovate-lanceolate striate shortly toothed bracts about 1·5 cm. long; corolla-tube glabrous outside .. 3. *guineensis*

Shrubs about 1 m. high; leaves ovate-oblong or subobovate, cordate at the base, about 12 cm. long and 6 cm. broad, pubescent below; spikes subsessile, about as long as the leaves; bracts lanceolate, spinulose-acuminate, sharply spinulose-dentate, about 2·5 cm. long .. .. .. .. .. .. .. .. .. 4. *elatior*

1. **C. flava** *Hook.* Bot. Mag. t. 4710—F.T.A. 5 : 113. A short-stemmed herb woody at the root, with rather long leaves and slender-tubular yellow flowers 1½ in. long in a very dense bracteate almost spiny spike 1–2 in. long.
Sierra Leone: Sugar Loaf Mt. York Pass (Jan., Dec.) ! Colonial Reserve (Jan.) ! Gold Coast: Akim, Kunkerentumi (Dec.) ! Kwahu, Ebene (Jan.) ! Oboum (Dec.) ! Dukweisin, Ashanti (Dec.) ! Togo: Misa-

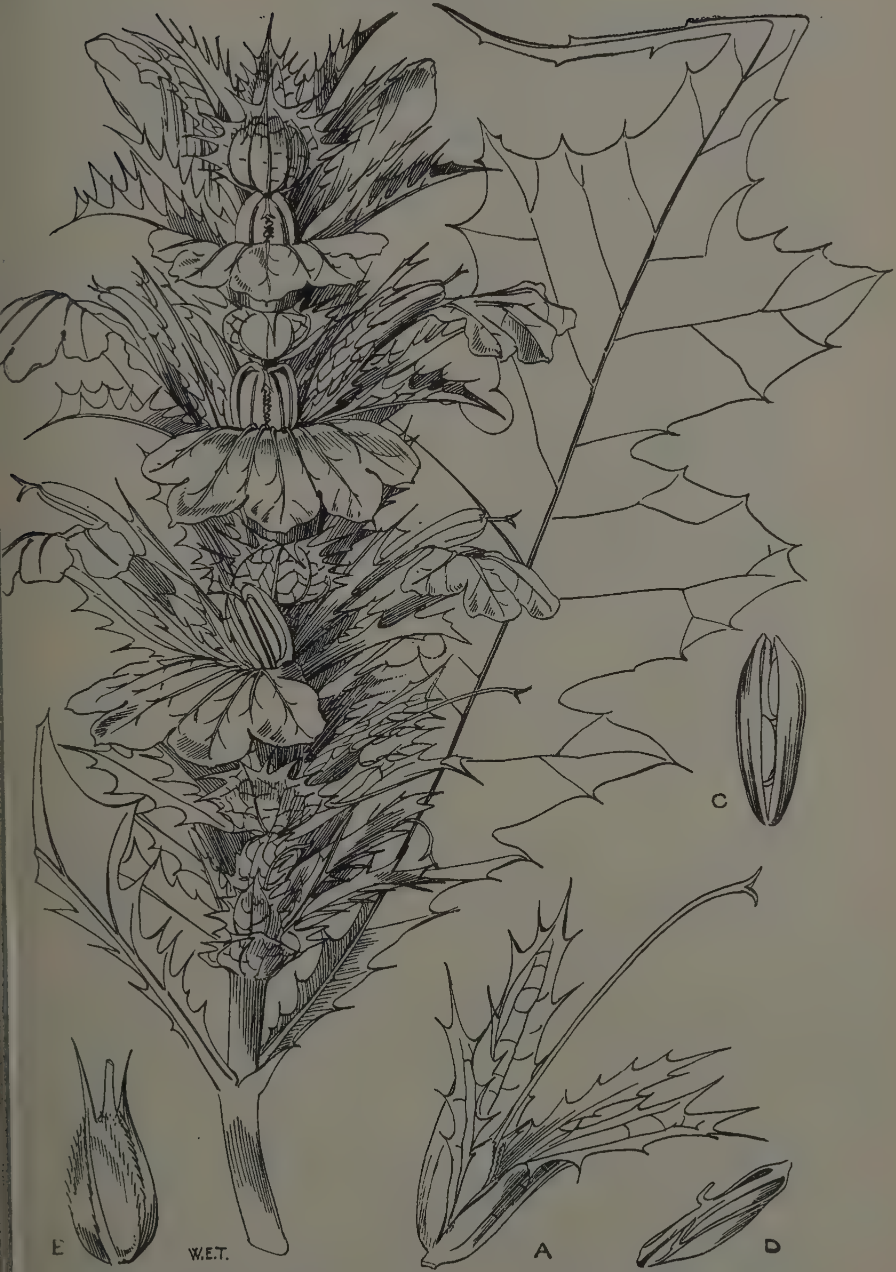

FIG. 268.—ACANTHUS MONTANUS *T. Anders.* (ACANTHACEAE).
A, bracts and pistil. B, calyx and ovary. C, fruit. D, one valve of fruit.

höhe (Nov.) ! S. Nigeria : ? localities ! Exsicc.—*Millson.* *Millen* 122. *Johnson* 271. *Unwin* and *Smythe* 24. *Lane-Poole* 183. *Chipp* 611 ; 635. *Mildbraed* 7347.

2. **C. Buntingii** *S. Moore* in Journ. Bot. 1911 : 321. A low herb with flowers 2–3 in. long.
   Liberia : swamps in Gola Forest near Barway ! Exsicc.—*Bunting.*
3. **C. guineensis** *Nees*—F.T.A. 5 : 117. *C. Talbotii* S. Moore. Stem densely short-hairy about 6 in. high, with leaves prominently nerved below and often vinous-tinged, and narrow spike 2–6 in. long of pale purplish or white flowers 1 in. long.
   Sierra Leone : Seli R. (Oct.) ! Gold Coast : Kibbi Hills (Dec.) ! S. Nigeria : Oban ! Victoria ; Barombi. Likomba ! Fernando Po, 2,000 ft. (Dec.) ! Extends to Gabon, and in Uganda. Exsicc.—*Mann* 50. *Johnson* 488. *N. W. Thomas* 3103. *Talb.* 1026. *Mildbr.* 10737 ; 10763.
4. **C. elatior** *S. Moore* in Talb. Cat. Nig. Pl. 79. A handsome plant about 3 ft. high with spikes of white flowers with a purple spot at the base of each posticous lobe.
   S. Nigeria : Oban ! Exsicc.—*Talb.* 80.

### 23. **BLEPHARIS** Juss.—F.T.A. 5 : 94.

Leaves obovate or broadly oblanceolate, rounded to acutely acuminate, about 4 in a whorl, up to 6 cm. long and 2 cm. broad, scabrid above, sparingly setulose below and on the margin ; inflorescence 1–1·5 cm. long ; bracts broadly obovate, with long stiff bristles on the margins, bristles with short reflexed hairs ; corolla 1-lipped, 1·3 cm. long .. .. .. .. .. .. .. .. 1. *maderaspatensis*

Leaves linear, up to 12 cm. long and 2 cm. broad, scabrid-setose above, glabrous below except on the midrib ; inflorescence strobilate, 3–8 cm. long ; bracts broadly ovate, spinous-toothed, ribbed ; corolla 1-lipped, about 2 cm. long, striate 2. *linariaefolia*

1. **B. maderaspatensis** *Heyne* ex *Roth*, Nov. Sp. 320. *Acanthus maderaspatensis* Linn. *B. boerhaaviaefolia* Pers.—F.T.A. 5 : 96 ; Chev. Bot. 496. *B. molluginifolia* A. Chev. Bot. 496, not of Pers. Suffrutescent herb, usually procumbent, coarsely pubescent on the young parts, with whorled leaves and white flowers ½ in. long in short finely-spiny spikes.
   French Sudan : San (Sept.) ! Koulikoro (Oct.) ! Senegal ! Sierra Leone : Hill Station (Dec.) ! Kumraba (Dec.–Jan.) ! Roruks (Nov.) ! Gold Coast : ? locality. N. Nigeria : Sokoto, on rocky hills (Sept.) ! S. Nigeria : Lagos Colony : ? locality ! In tropical Africa generally, extending to India. Exsicc.—*Heudelot* 509. *Sc. Elliot* 4525. *Millen* 50. *Dalz.* 362. *Chev.* 2783 ; 2784.
2. **B. linariaefolia** *Pers.*—F.T.A. 5 : 100 ; Chev. Bot. 496. A coarse woody shrublet about 1 ft. high, hairy on the young parts, with short 4-sided spikes (often in the forks of the branches) of blue (or lilac with darker lines) flowers ⅔–1 in. long enclosed in spine-toothed bracts.
   French Sudan : Goundam (Oct.) ! Senegal ! N. Nigeria : Nupe ! Kontagora (Nov.) ! Bauchi Plateau, Bauchi-Gombe Road ! Yola (Aug., Oct.) ! Benue R. ! Bornu ! Also in Mauritania, extending to E. Sudan, E. and S. Africa, and S.W. Asia. Exsicc.—*Heudelot* 179. *E. Vogel* 58. *Barter* 716. *Farmar* 71. *Dalz.* 142 ; 183. *Shaw* 84 ; 99. *Lely* 636.

### 24. **ACANTHUS** Linn.—F.T.A. 5 : 105.

Stems hirsute in the upper part ; leaves very shortly petiolate, obovate to oblanceolate, usually deeply pinnately lobed, rarely only dentate, spinous-toothed, up to 20 cm. long and 12 cm. broad, scabrid or thinly pilose ; spikes up to 20 cm. long ; bracts broadly ovate, 2–2·5 cm. long, spinous-toothed, pubescent to thinly villous ; adaxial calyx-segment much the largest, oblong, up to 5 cm. long ; corolla 6 cm. long, shortly spinulose-pubescent inside ; anthers densely villous, 1 cm. long ; fruit 2·5 cm. long *montanus*

**A. montanus** *T. Anders.*—F.T.A. 5 : 107 ; Stapf 640 ; Holl. 3 : 515 ; Chev. Bot. 496. *A. Barteri* T. Anders. A stout shrublet about 3 ft. high, sometimes half-decumbent, with long spiny leaves, and flowers 1½–2 in. long, white or purplish or pink-tinged, in strong spikes with spiny bracts.
French Guinea : Timbo ; Longuéry ; Bouloukountou. Sierra Leone : Kofiu Mt., Scarcies (Jan.) ! Lago ! Bumbuna (Oct.) ! Gorahun (Nov.) ! Liberia : Kakatown ! Gold Coast : ? locality ! Togo : Amedzofwe (Feb.) ! N. Nigeria : Lokoja, Patti (Nov.) ! Bauchi Plateau, Vom, 3,000–4,500 ft. ! S. Nigeria : Lagos Colony, various localities ! Ikirun ! Awka ! Onitsha ! Calabar (Jan.) ! Oban ! Rio del Rey ! Cameroons Mt. : Buea (Jan.) ! Fernando Po, 2,000 ft. (Nov., Dec.) ! Extends to Angola and Nyasaland. Exsicc.—*T. Vogel* 239. *Barter* 1300. *Mann* 639. *Millson* 17. *Sc. Elliot* 4619. *Rowland.* *Millen* 101 121. *Johnson* 275. *Whyte.* *Dalz.* 138. *Dent Young* 191. *Dunlap* 127. (See Appendix).

### 25. **CROSSANDRELLA** C.B.Cl. in Kew Bull. 1906 : 251.

Stems puberulous ; leaves oblong-lanceolate, gradually acuminate, acutely cuneate at the base, 10–18 cm. long, 4–5 cm. broad, with 15-18 pairs of spreading arcuate nerves, minutely punctate below ; petiole 2–3 cm. long ; spike about 10 cm. long ; bracts ovate, acutely acuminate, 8 mm. long, strongly nerved, glabrous ; bracteoles obovate-elliptic, 1 cm. long, 5-nerved ; calyx deeply 4-lobed ; corolla nearly 1·5 cm. long *Dusenii*

**C. Dusenii** *S. Moore* in Cat. Talb. Nig. Pl. 74. *Pseudoblepharis Dusenii* Lindau. *Acanthus Dusenii* Clarke—F.T.A. 5 : 108. *Crossandrella laxispicata* Clarke. An erect undershrub with rather long thin pale green leaves and bracteate flowers nearly ½ in. long in a terminal spike.
S. Nigeria : Oban ! Extends to Spanish Guinea, and in Uganda. Exsicc.—*Talb.* 1269.

### 26. **ELYTRARIA** Vahl.—F.T.A. 5 : 27.

A small herb with a rosette of leaves ; leaves broadly oblanceolate to obovate, obtusely triangular-pointed, rather abruptly attenuated to the base, very shortly petiolate, up to 15 cm. long and 5 cm. broad, very thinly pilose on the nerves ; inflorescence a slender pedunculate spike up to 15 cm. long ; bracts broadly ovate, bristly-acuminate, about 5 mm. long, green with paler shortly ciliate margins ; fruit 4–5 mm. long, glabrous.. .. .. .. .. .. .. .. .. .. *acaulis*

**E. acaulis** *Lindau* in Engl. and Prantl Nat. Pflanzenf. Nachtr. 1 : 304. *Justicia acaulis* Linn. f. *E. crenata* Vahl—F.T.A. 5 : 27 ; Stapf 638. *E. squamosa* Lindau ; Chev. Bot. 491. Stem 0–9 in. high, with small white or bluish flowers $\frac{1}{4}$–$\frac{1}{3}$ in. long in narrow stiff spikes with sharp-pointed bracts.

French Guinea : Farana, at Mangata ! Sierra Leone : Yonibana (Oct.) ! Newton (Nov.) ! Gegbwema, in forest (Nov.) ! Liberia : Grand Bassa (July) ! Ivory Coast : Bingerville ! Middle Cavally, Mt. Nienokoué ! Gold Coast : Ashanti, Amentia, in forest ! Togo : Segge Brook. N. Nigeria : Lokoja, ravines on Patti (Oct.) ! S. Nigeria : Lagos (in native garden, Oct.) ! Awta, in forest ! Warri and Benin. Onitsha ! Aguku ! Degema (Sept.) ! Man of War Bay ! Victoria ; Baromb . Fernando Po (Nov., Dec.) ! In tropical Africa generally ; also in tropical Asia. Exsicc.—*T. Vogel* 75 ; 93. *Barter* 1302. *Mann* 26. *Millen* 24. *Farmar* 519a. *N. W. Thomas* 4015. *Dalz.* 198 ; 1140. *Talb.* 386. *Staudt* 453. *Schlechter* 12386. (See Appendix).

### 27. NELSONIA R.Br.—F.T.A. 5 : 28.

A small herb with decumbent villous branches ; lower leaves long-petiolate, upper becoming subsessile, elliptic to ovate, entire, up to 4 cm. long, pubescent or often woolly ; flowers in cylindric villous spikes up to 10 cm. long ; bracts imbricate, broadly ovate, about 6 mm. long ; calyx-lobes 4, lanceolate, unequal, the largest often shortly bilobed ; fruits a little longer than the bracts .. .. *campestris*

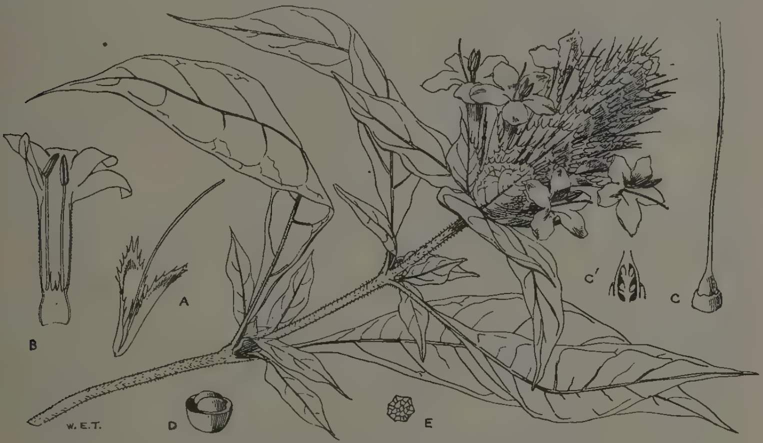

FIG. 269.—BARLERIA FLAVA *Jacq.* (ACANTHACEAE).

A, calyx and style. B, corolla laid open. C, pistil. C′, longitudinal section of ovary. D, cross-section of fruit. E, seed.

**N. campestris** *R. Br.*—F.T.A. 5 : 28 ; Chev. Bot. 491. Softly pubescent prostrate branching herb with erect spikes of small pink or purple flowers.

A common wayside weed, or in cultivated ground, in tropical Africa ! Also in Madagascar and tropical Asia. Exsicc.—*Boivin* 416. *Heudelot* 48. *Barter* 1159 ; 2046. *Mann* 253. *Brown-Lester* 48. *Sc. Elliot* 5905. *Cummins* 191. *Millen* 75. *Pobéguin* 627. *Preuss* 568. *Schlechter* 12308. (See Appendix).

### 28. BARLERIA Linn.—F.T.A. 5 : 140.

Branches without spines :
 Bracts with spiny teeth on the margin, strongly venose, broadly ovate, about 2·5 cm. long and 2 cm. broad ; corolla 5 cm. long ; leaves narrowly obovate, acutely acuminate, about 15 cm. long and 5 cm. broad, with rod-like cystoliths on the upper surface, appressed-pilose on the nerves below .. .. .. .. 1. *flava*
 Bracts entire or slightly denticulate on the margin :
  Leaves pilose or pubescent below :
   Leaves pilose over most of the lower surface ; inflorescence substrobilate ; bracts obovate, pilose ; corolla 4 cm. long, pubescent .. .. .. 2. *opaca*
   Leaves densely tomentose on both surfaces ; inflorescence substrobilate ; bracts ovate, tomentose, about 2 cm. long ; corolla 4 cm. long, nearly glabrous 3. *villosa*
   Leaves setose only on the nerves below ; flowers very few and not forming a strobilus ; bracts ovate, 1·5 cm. long, setulose ; corolla 3 cm. long, glabrous outside 4. *ruellioides*
  Leaves glabrous below, ovate-elliptic, shortly and acutely acuminate, rounded at the base, 6–9 cm. long, 3–4·5 cm. broad ; inflorescence substrobilate ; bracts broadly

obovate-orbicular, shortly ciliate, 2 cm. long; corolla 5 cm. long, pubescent; stamens long-exserted .. .. .. .. .. .. .. 5. *Talbotii*

Branches with spinulose-dentate spines at the nodes, softly pubescent; leaves oblanceolate, up to 4 cm. long and 1·5 cm. broad, loosely pilose, with a sharp tip; flowers solitary in the upper axils; corolla 2·5 cm. long, glabrous outside; fruit oblanceolate, 2 cm. long .. .. .. .. .. .. .. .. 6. *bornuensis*

1. **Barleria flava** *Jacq.*—F.T.A. 5 : 155; Chev. Bot. 497. A woody undershrub erect at first then often straggling, the stems covered with stiff yellowish hairs, the flowers nearly 2 in. long, yellow turning mauve in drying in dense bracteate spikes; cultivated as an ornamental plant in Europe.
French Sudan: Moussaia; Guienguénia. Senegal and French Guinea: several localities! Sierra Leone: Mofari! Scarcies R. (Jan.)! and ? locality! Ivory Coast: Bouroukrou, in forest undergrowth (Dec.–Jan.). Gold Coast: Ashanti, Banka! Exsicc.—*Heudelot* 644. *Sc. Elliot* 4423. *Farmar* 260a. *N. W. Thomas* 8254. *Irvine* 474.

2. **B. opaca** *Nees*—F.T.A. 5 : 163; Chev. Bot. 497. A straggling undershrub with much smaller leaves than the preceding, and white flowers 1½ in. long.
Sierra Leone. Ivory Coast: Anoumaba, in forest (Nov.)! Gold Coast: Accra! Akroful (Dec.)! Alafango, N. Terr.! Togo: Lome! Dahomey: Porto-Novo, Sakété (Jan.)! S. Nigeria: Lagos Colony! Abeokuta! Brass. Cameroons Mt., Buea and vicinity, 3,000–6,000 ft. (Jan.)! Exsicc.—*Don.* *Rowland.* *Millen* 46; 179. *Cummins* 30. *Dunlap* 161. *Preuss* 714. *Krause.* *Warnecke* 20.

3. **B. villosa** *S. Moore* in Journ. Bot. 1880 : 267. A woody climbing shrub with villous stems and foliage, and blue flowers 1½ in. long.
N. Nigeria: Bauchi Plateau; Vom, climbing over trees in creeks (Jan.)! Naraguta, 10 ft. long, on shrubs by streams (Jan.)! Also in Angola. Exsicc.—*Dent Young* 193. *Lely* P. 114.

4. **B. ruellioides** *T. Anders.*—F.T.A. 5 : 165. Woody herbaceous straggling plant with pale blue sub-campanulate flowers 1–1½ in. long.
N. Nigeria: Nupe! Lokoja, cliffs of Patti (Nov.)! Exsicc.—*Barter* 932. *Dalz.* 141.

5. **B. Talbotii** *S. Moore* in Cat. Talb. Nig. Pl. 86. A straggling shrub with smooth branches and blue flowers about 2 in. long.
S. Nigeria: Oban. Exsicc.—*Talb.* 1396.

.**B. bornuensis** *S. Moore* in Cat. Talb. Nig. Pl. 85. Low, branched, woody undershrub of savannah, with spines ½–¾ in. long, and blue flowers 1 in. long.
N. Nigeria: Sokoto and Kontagora (Apr., May, Dec.)! Nassarawa, Keana! Lake Chad! Exsicc.—*Talb.* 1009. *Dalz.* 359. *Hepburn* 53.

## 29. ERANTHEMUM Linn.—F.T.A. 5 : 169.

Flowers borne singly or in pairs in a very slender spike; calyx-segments about 5 mm. long, subulate-filiform; leaves narrowly obovate, gradually acuminate, very acute at the base, up to 15 cm. long and 7 cm. broad, glabrous; corolla-tube 2·5 cm. long, glabrous, lobes 1 cm. long; fruit slender, scarcely 2 cm. long .. 1. *nigritianum*

Flowers in clusters in the spike or in cymules forming a narrow panicle:

Flowers in subsessile clusters on the rhachis; styles persistent and thread-like; corolla-tube 3·5 cm. long, lobes about 1·5 cm. long; leaves more or less as above but larger .. .. .. .. .. .. .. .. .. 2. *Ludovicianum*

Flowers in shortly stalked cymules; calyx-lobes broadly subulate-lanceolate; corolla-tube 2·5 cm. long; anthers exserted; leaves small and ovate or elliptic, broadly acuminate, 5–12 cm. long, 3–5 cm. broad, nearly glabrous; fruit 4 cm. long, stoutly clubshaped .. .. .. .. .. .. .. .. 3. *hypocrateriforme*

1. **E. nigritianum** *T. Anders.*—F.T.A. 5 : 171; Chev. Bot. 500, as *Pseuderanthemum*. A woody herb or undershrub of the forest, 1–2 ft. high, with pale bluish or lilac or nearly white flowers, spotted on the lip, 1–1½ in. long including the corolla-lobes and slender tube.
Sierra Leone: Kukuna, Scarcies R. (Jan.)! Freetown, in a ravine (Jan.)! Njala (July)! Ndilajula (Feb.)! Ivory Coast: various localities! Gold Coast: Akim, Tumfa (Dec.)! W. Ashanti, Sunyani, and Nkwanta (Jan.)! Togo! S. Nigeria: Eket! Oban! Victoria! Fernando Po (Jan.)! Extends to Angola. Exsicc.—*Barter* 3300. *Mann* 156. *Sc. Elliot* 4692. *Johnson* 278. *Farmar* 518. *Dalz.* 948. *Chipp* 64; 74. *Baumann* 375. *Preuss* 1108; 1366.

2. **E. Ludovicianum** *Buettn.*—F.T.A. 5 : 172. A forest undershrub up to 12 ft. high, with narrow tubular flowers white or purplish-tinged, 1½ in. or more long forming a spike-like panicle 4–10 in. long.
Gold Coast: Assin Yan Kumasi! Bowka, Ashanti! S. Nigeria: Oban! Victoria! Johann-Albrechtshöhe! Buea and above, 3,500 ft. (Feb.)! Fernando Po! Also in French Cameroons. Exsicc.—*Mann* 1437. *Cummins* 237. *Dalz.* 8210. *Talb.* 1398. *Irvine* 492. *Preuss* 598. *Staudt* 537; 561. *Schlechter* 12853.

3. **E. hypocrateriforme** *Roem. & Schult.*—F.T.A. 5 : 171. A shrubby plant 3–4 ft. high, with stiff pithy angled branches, and slender tubular flowers 1½ in. long coral-red with a darker centre forming a rather dense linear panicle 2–7 in. long.
Senegal: Casamance, Carabane (Jan.)! Sierra Leone: Scarcies R., Wallia (Jan.)! Colonial Reserve (Jan.)! other localities! Gold Coast: Accra and vicinity, common (Jan.–Mar.)! Aburi Hills (Nov., June)! Togo: Lome! S. Nigeria: Lagos Colony, Eruwa! Oban! Okuni, Cross R. (Jan.)! Extends to E. Sudan and E. Africa. Exsicc.—*T. Vogel* 159. *Rowland.* *Sc. Elliot* 4451. *Dalz.* 72. *Holl.* 172. *Warnecke* 7; 386. *Chev.* 2795.

## 30. ADHATODA Nees—F.T.A. 5 : 221.

Lateral nerves about 15 pairs, puberulous below; leaves broadly elliptic, acuminate, shortly decurrent on the petiole, 17–25 cm. long, 8–10 cm. broad; petiole up to 4 cm. long; panicle large, with stiff ascending branches; bracts leafy; bracteoles obovate-oblanceolate, pubescent; calyx-segments oblong-lanceolate, 1 cm. long, shortly pubescent; ovary pubescent; corolla 2 cm. long .. .. .. .. 1. *robusta*

Lateral nerves up to 10 pairs:

Inflorescence a lax panicle, with zigzag branches and large orbicular leafy bracts 1·5 cm. in diam.; leaves obovate-elliptic, rather abruptly acuminate, about 15 cm. long and 8 cm. broad, glabrous; lateral nerves about 6 pairs; calyx-segments lanceolate, about 8 mm. long .. .. .. .. .. 2. *Buchholzii*

Inflorescence a lax spike; bracts narrowly lanceolate, about 5 mm. long; leaves broadly elliptic, broadly acuminate, about 15 cm. long and 9 cm. broad, glabrous; lateral nerves 5–6 pairs; calyx-segments as above .. .. 3. *maculata*

Inflorescence a dense spike:

Bracts linear-lanceolate; spikes slender, about 15 cm. long; leaves obovate, auriculate at the broadly cuneate base, 14–18 cm. long, 5–8 cm. broad, minutely pubescent below, with 9–10 pairs of lateral nerves; corolla 1 cm. long 4. *tristis*

Bracts suborbicular, overlapping, strongly nervose, about 1·3 cm. long, softly puberulous; spikes strobiliform, elongated, up to 25 cm. long, pedunculate; leaves elliptic-obovate, shortly acuminate, broadly cuneate at the base, up to 25 cm. long and 12 cm. broad, shortly pubescent on the nerves and veins below 5. *orbicularis*

1. **Adhatoda robusta** *C.B.Cl.*—F.T.A. 5 : 223. A shrub or small tree up to 15 ft. high, brownish-tomentose on the young parts, with large shining leaves and white flowers ¾ in. long in a large erect panicle.
Gold Coast: Akwapim Hills (Oct.)! S. Nigeria: Degema! Fernando Po, 3,000 ft. (Dec.)! Exsicc.—*Mann* 634. *Johnson* 793. *Talb.* 3646.

2 **A. Buchholzii** *S. Moore* in Cat. Talb. Nig. Pl. 74. *Duvernoia Buchholzii* Lindau.—F.T.A. 5 : 223, under *A. maculata.* A climbing shrub finely rusty-pubescent on the young parts, becoming glabrous, with fairly large leaves and white flowers about ¾ in. long in interrupted spikes forming a panicle; fruits 1 in. long.
S. Nigeria: Oban! Also in Cameroons. Exsicc.—*Talb.* 1025. (See Appendix).

3. **A. maculata** *C.B.Cl.*—F.T.A. 5 : 223, partly. A climbing shrub like the last, with interrupted simple spikes of flowers 1 in. long, white with purple spots.
Fernando Po (Jan.)! Exsicc.—*Mann* 202.

4. **A. tristis** *Nees*—F.T.A. 5 : 223. *A. auriculata* S. Moore. Herbaceous undershrub 2–4 ft. high, with 4-angled branches brownish-pubescent when young, with purple flowers ¾ in. long in spikes interrupted at the base.
S. Nigeria: Oban! Fernando Po (Nov., Jan.)! Exsicc.—*T. Vogel* 161. *Mann* 165. *Talb.* 2011.

5. **A. orbicularis** *C. B. Cl.*—F.T.A. 5 : 222. A shrub about 12 ft. high, tawny-pubescent on the young parts, with rather large leaves and flowers ½ in. long in long close spikes with strongly-nerved bracts.
S. Nigeria: Oban! Fernando Po! Also in Cameroons. Exsicc.—*Mann* 1435. *Talb.* 975.

## 31. GRAPTOPHYLLUM Nees—F.T.A. 5 : 241.

Leaves oblong-elliptic, very shortly and broadly acuminate, acute at the base, 9–15 cm. long, 5–7 cm. broad, with 7–8 pairs of lateral nerves, glabrous; petiole about 5 mm. long; racemes several-flowered; pedicels with 3–4 small bracts at the base, about 5 mm. long; calyx-lobes lanceolate, 3–5 mm. long; corolla glabrous, 3·5 cm. long, limb very oblique; stamens 2, exserted, anther-cells equal .. .. 1. *pictum*

Leaves more or less as above but with longer acumen and long petioles; calyx and corolla minutely glandular .. .. .. .. .. .. 2. *glandulosum*

1. **G. pictum** *Griff.* Notul. 4 : 139. *Justica picta* Linn. *G. hortense* Nees—F.T.A. 5 : 241. A glabrous shrub with variegated leaves, often copper-coloured, and red-purple tubular flowers 1–1½ in. long in narrow panicles.
Planted in gardens as an ornamental plant; native country uncertain; sometimes known as "Joseph's Coat."

2. **G. glandulosum** *Turrill* in Kew Bull. 1912 : 331. A shrub with 4-angled, nearly glabrous branches, and red-purple flowers 1 in. or more long.
S. Nigeria: Oban! Cross River district, Ifunkpa-Atakom (Dec.)! Johann-Albrechtshöhe! Exsicc.—*Talb.* 377. *Holl.* 216. *Staudt* 455.

## 32. SCHAUERIA Nees—F.T.A. 5 : 242.

Branchlets glabrous; leaves ovate, rather abruptly acuminate, cordate at the base, 8–10 cm. long, 3·5–6·5 cm. broad, covered with numerous minute rod-like cystoliths; petiole up to 7 cm. long, pubescent; inflorescence spike-like, cylindric, up to 9 cm. long; bracts filiform, 1–1·5 cm. long, with stipitate glands towards the apex; calyx-lobes subulate, 6 mm. long; corolla 1·5 cm. long; stamens 2; anther-cells 2, rounded at the base, pubescent at the tip .. .. .. .. .. .. *populifolia*

**S. populifolia** *C.B.Cl.*—F.T.A. 5 : 242. Herbaceous undershrub 4–5 ft. high, with red-purple flowers ½–⅔ in. long in a dense cylindrical panicle.
S. Nigeria: Oban! Fernando Po (Nov.)! Also in Cameroons. Exsicc.—*T. Vogel* (no number). *Mann* 1426.

## 33. CHLAMYDOCARDIA Lindau—F.T.A. 5 : 234.

Branches with a line of hairs up the side; leaves narrowly ovate-elliptic, gradually acuminate, cuneate at the base, 6–8 cm. long, 2·5–3·5 cm. broad, with numerous rod-like cystoliths more conspicuous below; spikes terminal, up to 7 cm. long; bracts very broadly spathulate, apiculate, stipitate, leafy, about 8 mm. long and 4–5 mm. broad; calyx-segments linear, 5 mm. long; corolla shorter than the calyx; stamens 2, anther-cells muticous; fruit 1 cm. long; seeds tuberculate .. .. 1. *Buettneri*

Branches, etc., as above, but leaves ovate, acuminate at each end; spikes about 15 cm. long, pubescent; calyx 6 mm. long; corolla longer than the calyx, with a slender tube .. .. .. .. .. .. .. .. 2. *subrhomboidea*

1. **C. Buettneri** *Lindau*—F.T.A. 5 : 234. Slender, branched, woody herb, 12–18 in. high, creeping at the base, with narrow-cylindric 2-lipped whitish flowers ⅓ in. long in narrow spike-like panicles.
S. Nigeria: Oban! Victoria. Extends to Gabon. Exsicc.—*Talb.* 1374.

2. **C. subrhomboidea** *Lindau*—F.T.A. 5 : 235. A herb over 1 ft. high.
S. Nigeria: between Victoria and Bimbia! Exsicc.—*Preuss* 1309.

### 34. **ANISOTES** Nees—F.T.A. 5 : 226.

Stems puberulous; leaves oblong-oblanceolate, obtuse at the apex, 5–8 cm. long, 2–4 cm. broad, shortly pubescent on the midrib; flowers solitary, axillary; bracteoles 2 cm. long, oblong; corolla 4 cm. long, 2-lipped nearly to the base, tube 1 cm. long, glabrous .. .. .. .. .. .. .. .. .. *guineensis*

**A. guineensis** *Lindau* in Bull. Soc. Bot. Fr. Mém. 8B : 53. Erect woody shrub.
French Guinea: between Diaguissa and Timbo 3,000–3,500 ft. (Apr.)! Exsicc.—*Chev.* 13444.

### 35. **PERISTROPHE** Nees—F.T.A. 5 : 242.

Stems sparingly setose-pilose; leaves subequal, ovate-lanceolate, acute, abruptly narrowed into the winged petiole, up to 10 cm. long and 4 cm. broad, with conspicuous rod-like cystoliths on both sides; flowers very numerous in a lax leafy panicle; pedicels angular and scabrid; calyx-segments linear-lanceolate, very acute, 8 mm. long; corolla 1·5 cm. long; stamens 2, anthers 2-celled; fruit 1 cm. long, pubescent .. .. .. .. .. .. .. .. .. *bicalyculata*

**P. bicalyculata** *Nees*—F.T.A. 5 : 242; Holl. 3 : 516; Chev. Bot. 501. *P. pilosa* Turrill. Erect, branched herb, 2–4 ft. high, with stems several-angled, and narrow pink or pale purple flowers ⅓–½ in. long.
Senegal: common! Gambia! N. Nigeria: Borgu, Fakum! Sokoto (Nov.)! Katagum (Sept.)! Bornu, Kuka (Feb.)! Throughout tropical Africa, Cape Verde Islands, Mauritania to Arabia. Exsicc.—*Roger*. *Boteler*. *E. Vogel* 34. *Barter* 767. *Farmar* 18. *Lely* 415. (See Appendix).

### 36. **ISOGLOSSA** Oerst.—F.T.A. 5 : 227.

Leaves rounded at the base, subequal in each pair, ovate, acuminate, up to 7 cm. long and 3·5 cm. broad, with small rod-like cystoliths very conspicuous on the nerves; petiole slender, up to 3 cm. long, the upper leaves becoming sessile; panicle slender, few-flowered; calyx-lobes 2·5 mm. long, fringed with gland-tipped hairs: corolla 2 cm. long; stamens 2; anther-cells widely separated; fruit 1·5 cm. long 1. *glandulifera*

Leaves cuneate at the base, subequal, ovate, acuminate, up to 8 cm. long and 4·5 cm. broad, with very short rod-like cystoliths on the upper surface, pubescent on the nerves below; petiole pilose with multicellular hairs; panicle as above 2. *nervosa*

1. **I. glandulifera** *Lindau*—F.T.A. 5 : 229. Erect, slender-branched herb, 4–10 ft. high, with very thin leaves and light red flowers ¾ in. long in a lax slightly glandular panicle.
Cameroons Mt., 3,900–7,000 ft. (Nov.)! Fernando Po, 4,000 ft. (Nov.)! Exsicc.—*Mann* 579; 1972. *Johnston* 62. *Preuss* 1062.
2. **I. nervosa** *C.B.Cl.*—F.T.A. 5 : 229. Stems fairly stout, ribbed, rather densely glandular-hairy on the young parts, 5 ft. high, with coarser strongly-nerved leaves and white flowers (turning reddish).
Cameroons Mt., 7,000 ft. (Dec.)! Exsicc.—*Mann* 2009. *Johnston* 63.

### 37. **DICLIPTERA** Juss.—F.T.A. 5 : 256.

Bracteoles with sharp spiny tips:
  Bracteoles gradually acuminate, narrowly oblanceolate, densely villous-ciliate, 5–6 mm. long; leaves long-petiolate, ovate, broadly acuminate, about 6 cm. long and 3 cm. broad, with prominent rod-like cystoliths on the lower surface 1. *micranthes*
  Bracteoles obovate-elliptic, abruptly spiny at the apex, glandular-puberulous and sparingly ciliate; leaves similar to above.. .. .. .. 2. *umbellata*
Bracteoles not spiny at the tips:
  Bracteoles suborbicular to broadly obovate, sometimes nearly as broad as long:
    Bracteoles densely fringed with long soft white hairs, suborbicular, 6–8 mm. long; leaves narrowly obovate, broadly acuminate, cuneate at the base, 3–8 cm. long and 1·5–3 cm. broad, with rod-like cystoliths .. .. .. .. 3. *Elliotii*
    Bracteoles fringed with hairs, broadly obovate, 1–2 cm. long, strongly nerved; leaves on long slender petioles, narrowly obovate, broadly acuminate, 8–12 cm. long, 2–4 cm. broad, with about 6 pairs of lateral nerves .. .. .. 4. *obanensis*
  Bracteoles oblong-elliptic to oblanceolate:
    Bracteoles oblong-elliptic, not narrowed to the base, 5–6 mm. long, with prominent green veins; spikes lax; leaves ovate-elliptic, abruptly acuminate, 4–6 cm. long, 2–3·5 cm. broad, with minute hair-like cystoliths; petiole about 2 cm. long 5. *alternans*
    Bracteoles oblanceolate, narrowed to the base:
      Bracteoles villous; leaves lanceolate, 5–6 cm. long, 1–2 cm. broad; flowers crowded 6. *Lelyi*
      Bracteoles glabrescent; leaves oblanceolate, about 1·5 cm. long; flowers lax 7. *laxispica*

1. **Dicliptera micranthes** *Nees*—F.T.A. 5 : 258. Stems several-angled, 1–2 ft. long, rather slender, with flowers ⅓ in. long in spikelets in axillary whorls often down to the lowest axils.
Senegal! Also in Cape Verde Islands, E. Sudan and Abyssinia. Exsicc.—*Roger* 42.
2. **D. umbellata** *Juss.*—F.T.A. 5 : 259. Stems several-angled almost woody below, decumbent, with red flowers in whorls running into terminal spikes.
Senegal: Brava Island! Sierra Leone: Gbanbama (Mar.)! S. Nigeria: Lagos! Aguku! Eket! Also in Cape Verde Islands, Congo, Angola and E. Africa. Exsicc.—*Brunner*. *Barter* 2176. *N. W. Thomas* 1394 (Nigeria); 8924 and 9432 (S. Leone). *Talb.* 3202.

3. **D. Elliotii** *C.B.Cl.*—F.T.A. 5 : 258. Decumbent, 1 ft. or more long, slightly angled stems, with small white flowers ⅓ in. long in axillary and terminal whorls of broad-bracteate spikelets.
French Sudan : Banancoro, by a marsh (Feb.) ! Sierra Leone : Scarcies R., Wallia (Jan.) ! Njala (Mar.) ! Toma (Feb.) ! Exsicc.—*Sc. Elliot* 4632. *N. W. Thomas* 8793. *Deighton* 1101. *Chev.* 502.

4. **D. obanensis** *S. Moore* in Cat. Talb. Nig. Pl. 90. Decumbent herb with ascending branches, soon glabrous, with white flowers ½–⅝ in. long, 2 in the spikelet in subdistant whorls with broad bracts.
S. Nigeria : Oban ! Exsicc.—*Talb.* 1363.

5. **D. alternans** *Lindau*—F.T.A. 5 : 258. A slender-stemmed herb, slightly pubescent, with white flowers nearly ½ in. long in a loose spike with green-veined bracts.
Cameroons Mt. : near Buea (Jan.) ! Exsicc.—*Preuss* 604.

6. **D. Lelyi** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Erect, branched herb, woody below, with several-angled stems nearly glabrous, and many flowers ½–⅝ in. long, pinkish purple with spots and a darker lower lip.
N. Nigeria : Bauchi Plateau, Naraguta, in farms (Nov.) ! Exsicc.—*Lely* 712 ; P. 91.

7. **D. laxispica** *Lindau* in Engl. Bot. Jahrb. 30 : 113. A decumbent herb rooting at the lower nodes, with small leaves and small white flowers ¼ in. long.
S. Nigeria : Oban ! Also in Cameroons. Exsicc.—*Talb.*

## 38. JUSTICIA Linn.—F.T.A. 5 : 179.

Flowers axillary ; stems pubescent to glabrous ; leaves very variable, from linear to ovate, subsessile to long-petiolate, acute or acuminate, up to 12 cm. long and 4 cm. broad, setulose to nearly glabrous ; calyx-lobes lanceolate, acuminate, more or less ciliate ; corolla up to 2·5 cm. long, pubescent outside ; fruit 1·5 cm. long, slightly pubescent or glabrous .. .. .. .. .. .. .. .. 1. *insularis*

Flowers spicate racemose or paniculate :

Flowers all to one side of the short slender spikes ; leaves linear to lanceolate, acute, 3·5–6 cm. long, up to 1 cm. broad, glabrous or nearly so, thin ; calyx-segments subulate-lanceolate, 3·5 mm. long, with narrow hyaline margins ; fruit 1 cm. long, glabrous .. .. .. .. .. .. .. .. 2. *Anselliana*

Flowers not all to one side of the inflorescence :

Inflorescence spicate :

Spikes interrupted, the lower internodes 1 cm. long ; flowers in small dense cymules ; leaves broadly obovate, acuminate, cuneate at the base, 10–18 cm. long, 5–8 cm. broad, glabrous, with about 5 pairs of lateral nerves ; petiole 2–5 cm. long ; corolla 1 cm. long ; stamens exserted .. .. .. .. .. 3. *nigerica*

Spikes more or less continuous :

Spikes terminal, with lanceolate or linear bracts :

Bracts lanceolate from an ovate base, about 2·5 cm. long, setose-pilose on the margin, prominently trinerved from above the base ; leaves narrowly lanceolate, 3-nerved .. .. .. .. .. .. .. .. 4. *togoensis*

Bracts oblanceolate, narrowed to the base, about 1 cm. long, ciliate ; leaves ovate to lanceolate, acuminate, pinnately nerved up to 12 cm. long and 5 cm. broad, pubescent ; fruit 1 cm. long .. .. .. .. .. .. 5. *flava*

Spikes lateral, 1–2 cm. long, on slender peduncles, with broadly obovate nervose bracts about 5 mm. long ; leaves ovate, long-petiolate, rounded at the apex, up to 5 cm. long and 3 cm. broad, very thin and glabrescent ; fruits 3 mm. long 6. *tenella*

Inflorescence paniculate :

Herbs about 1·5 m. high :

Bracts leafy ; panicle large and spreading ; leaves long-petiolate .. 7. *laxa*

Bracts linear to subulate ; panicle small and compact ; leaves very shortly petiolate, elliptic, acuminate, about 9 cm. long and 5 cm. broad ; calyx-segments linear-lanceolate, 4 mm. long .. .. .. .. .. 8. *thyrsiflora*

Herbs about 15 cm. high ; leaves subradical, elliptic, rounded at the base, 5–6 cm. long, about 4 cm. broad, sometimes bullate ; petiole up to 2 cm. long, tomentose ; panicle lax ; calyx-lobes filiform ; corolla 1·5 cm. long .. .. 9. *tenuipes*

1. **Justicia insularis** *T. Anders.*—F.T.A. 5 : 195. *J. Galeopsis* T. Anders. ; Stapf 642 ; Chev. Bot. 500. *Siphonoglossa Macleodiae* S. Moore. A straggling herb, 1–3 ft. high, rooting below, with bright pink, red-purple or sometimes yellowish flowers with purple markings, ¾ in. long, 1–3 in the axils.
Senegal : Niayes. Gambia ! French Guinea : Kouria (Oct.). Sierra Leone : fairly common ! Liberia : Monrovia ! Kakatown ! Gold Coast : Ashanti, Tano-Ofin Reserve (Jan.) ! Togo : Kpedsu (Jan.) ! Dahomey ! N. and S. Nigeria : common ! Fernando Po (Nov., Jan.) ! Extends to Congo Basin and Angola. Exsicc.—*T. Vogel* (no number). *Skues. Barter* 1038. *Irving* 65. *Burton. Mann* 168. *Millson* 40. *Rowland. Millen* 61 ; 169. *Sc. Elliot* 3974 ; 4149. *Whyte. Vigne* 1012. *Talb.* 1309. (See Appendix).

2. **J. Anselliana** *T. Anders.*—F.T.A. 5 : 208 ; Stapf 642. A nearly glabrous herb, erect or decumbent, 1–2 ft., with small white and purple-streaked flowers ¼ in. long, few in short axillary one-sided inflorescences.
Liberia : Cape Palmas ! N. Nigeria : Bauchi Plateau, Naraguta and Jos (Apr., Sept.) ! S. Nigeria : Abo (Aug.) ! Throughout tropical Africa. Exsicc.—*Ansell. T. Vogel* 14. *Lely* P. 232 ; 571.

3. **J. nigerica** *S. Moore* in Cat. Talb. Nig. Pl. 81. A woody undershrub with fairly stout puberulous branches, and flowers ⅓ in. long in spikes up to 9 in. or more long, simple or slightly compound below.
S. Nigeria : Oban ! Exsicc.—*Talb.* 995 ; 1270 ; 1308 ; 2008. (See Appendix).

4. **J. togoensis** *Lindau*—F.T.A. 5 : 194. A coarse herb with sulcate harshly hairy stems (when young), and flowers ⅔ in. long in a short dense terminal white-hispid spike.
Togo : Misahöhe (Nov.) ! Exsicc.—*Mildbraed* 7236.

5. **J. flava** *Vahl*—F.T.A. 5 : 190 ; Chev. Bot. 500. Herb, erect or straggling, 1–4 ft., with pubescent sulcate stems and yellow dark-streaked flowers ⅓–½ in. long in pubescent spikes 2–6 or more inches long.
French Guinea : Kouria. Sierra Leone to Gold Coast : common by forest paths, etc. ! Togo : Lome, etc. ! N. Nigeria : Lokoja, Patti (Sept., Oct.) ! Alkalire ! S. Nigeria : Lagos ! Lagos Colony ! Onitsha !

Aguku ! Degema ! Extends to Angola, and to Red Sea, Upper Nile Land and E. Africa. Exsicc.—*T. Vogel* 167. *Barter* 619; 1779. *Rowland. Millen* 32; 37. *Chipp* 486. *Rattray* 10; 12. *Talb.* 3659. *Buettner* 258. *Warnecke* 443. (See Appendix).

6. **J. tenella** *T. Anders.*—F.T.A. 5 : 187; Chev. Bot. 501. A slender nearly glabrous herb, erect 6–12 in. high, creeping and rooting at the lower nodes, with small white and lilac or pink-tinged flowers in short 4-sided spikes with pale green broad bracts.

Senegal, French Guinea and Sierra Leone: fairly common in moist shady places ! Ivory Coast: Attié, Alépé (Feb.–Mar.); Cavally Basin, Grabo (Aug.). Gold Coast: Aburi ! N. Nigeria: Kontagora (Dec.) ! S. Nigeria: Oban ! Rio del Rey ! Throughout tropical Africa. Exsicc.—*Heudelot* 327. *Sc. Elliot* 3851. *Johnston* 44. *Farmar* 190. *Dalz.* 185.

7. **J. laxa** *T. Anders.*—F.T.A. 5 : 205; Stapf 642. *J. extensa* T. Anders.; Holl. 3 : 515. *J. Talbotii* S. Moore. Herbaceous undershrub 4–5 or more ft. high or more or less straggling, with fairly large leaves and loose panicles of greenish-white red-tipped flowers ½–⅔ in. long.

Sierra Leone to Gold Coast: common in forest undergrowth ! Togo: Misahöhe (Nov.) ! S. Nigeria Lagos, Epe, etc. (Dec.) ! Eket! Oban ! Cross R. ! Victoria ! Fernando Po (Nov., Dec.) ! Extends to Angola and E. Africa. Exsicc.—*T. Vogel* 144. *Barter* 3301. *Mann* 63. *Johnston. Rowland. Sc. Elliot* 4210. *Millen* 21. *Johnson* 582. *Whyte. Talb.* 1408. *Preuss* 1350. *Mildbraed* 7274. (See Appendix).

8. **J. thyrsiflora** *S. Moore* in Cat. Talb. Nig. Pl. 84. Herbaceous undershrub densely pubescent on the young stems, with small flowers ¼ in. long in a short-branched tawny-pubescent inflorescence 1–3 in. long.

S. Nigeria: Oban ! Exsicc.—*Talb.* 976; 1371.

9. **J. tenuipes** *S. Moore* l.c. 82. A short-stemmed herb, creeping and rooting below, densely pubescent, with wrinkled leaves and narrow flowers ½–⅔ in. long in a glandular-pubescent loose panicle, sometimes reduced to 1 or 2 flowers.

S. Nigeria: Oban ! Exsicc.—*Talb.* 1327; 1483.

## 39. **MONECHMA** Hochst.—F.T.A. 5 : 212.

Bracts pectinate with long stiff white bristles, lanceolate, leafy, about 1·5 cm. long; leaves linear or narrowly linear-lanceolate, up to 12 cm. long and 1·5 cm. broad, more or less pilose; spikes short; calyx-segments subequal, linear, hispid; corolla 1·5 cm. long; fruit 1 cm. long .. .. .. .. .. .. 1. *hispidum*

Bracts at most shortly ciliate, lanceolate, green with pale margins; leaves lanceolate, up to 10 cm. long and 3 cm. broad, pilose on the nerves below; spikes up to 6 cm. long; calyx-segments 5 mm. long, puberulous; corolla 1·3 cm. long; fruit nearly 1 cm. long .. .. .. .. .. .. .. .. 2. *depauperatum*

1. **M. hispidum** *Hochst.*—F.T.A. 5 : 213. Herb 1–2 ft. high, coarsely whitish-hairy, woody below, with 2–lipped cream-white flowers purple- and orange-streaked; in grass savannah and in fields.

Senegal ! Gambia ! Sierra Leone: Scarcies R., Buyabuya (Feb.) ! Togo: Misahöhe (Oct.) ! Sokode-Basari ! Ketschenke (Aug.) ! N. Nigeria: common ! S. Nigeria: Lagos Colony ! Extends to E. Sudan and E. Africa. Exsicc.—*Heudelot* 167; 505 (partly). *Brown-Lester* 51. *Sc. Elliot* 4588. *Dalz.* 101; 140; 182; 800. *Lely* 349. *Dent Young* 201. *Dodd* 426. *Buettner* 148. *Baumann* 326. *Schroeder* 104. (See Appendix).

2. **M. depauperatum** *C.B.Cl.*—F.T.A. 5 : 217. An erect branched undershrub several feet high (in grass) with pubescent angled stems, and white purple-streaked flowers ½ in. long.

Sierra Leone: Lomaburn (Feb.) ! Gold Coast: Afram Plains (Jan.) ! Togo: Jegge (fl. and fr. Sept.). N. Nigeria: Bauchi Plateau, Naraguta (Nov.) ! Panyam, 4,500 ft. (July) ! S. Nigeria: Abeokuta ! Lagos, Ikoyi (Dec.) ! Onitsha ! Agolo ! Extends to Cameroons and Angola. Exsicc.—*Barter* 592; 1300. *Rowland. Sc. Elliot* 5035. *Lely* 409; 694. *Irvine* 621. *Buettner* 202.

## 40. **RHINACANTHUS** Nees—F.T.A. 5 : 224.

Branches slightly pubescent; leaves equal to very unequal-sized in each pair, ovate-lanceolate to lanceolate, gradually acuminate, cuneate at the base, up to 12 cm. long and 4·5 cm. broad, with numerous but rather obscure rod-like cystoliths on both surfaces; panicles axillary and terminal; pedicels and linear calyx-segments glandular-puberulous; corolla-tube slender, tubular, 1·5 cm. long; stamens 2; anthers shortly exserted; fruit 1·5 cm. long, softly pubescent; seeds finely warted *communis*

**R. communis** *Nees*—F.T.A. 5 : 224; Stapf 642. *R. subcaudatus* C.B.Cl. Herb 1–3 ft. high or weak undershrub woody below, with slender white or purplish flowers about 1 in. long; variable in habit.

Sierra Leone: Scarcies R., Wallia and Sasseni (Jan., Feb.) ! Bafi R. (Feb.) ! Makump (Jan.) ! Liberia: Kakatown ! Gold Coast: Ashanti, Agogo (Dec.) ! S. Nigeria: Ubulubu (Feb.) ! Eket ! Oban ! Victoria (Jan., Feb.) ! All over tropical Africa. Exsicc.—*Sc. Elliot* 4276; 4428. *Whyte. Talb.* 1365; 3131. *Dalz.* 8200. *Winkler* 668.

## 41. **RUNGIA** Nees—F.T.A. 5 : 252.

Bracts without hyaline margins, rather loosely arranged, obliquely ovate, gradually acuminate, 1–1·5 cm. long; inflorescence 7–8 cm. long; leaves ovate-elliptic, gradually acuminate, about 14 cm. long and 6 cm. broad, with about 8 pairs of lateral nerves; branches constricted above the nodes, glabrous .. .. 1. *dimorpha*

Bracts with a green middle portion and broad pale hyaline margins:

Bracts rounded or emarginate at the apex:

Bracts woolly-tomentose outside, about 8 mm. long; inflorescence strobilate, 5–6 cm. long, about 1·5 cm. diam.; leaves lanceolate, 2 cm. long, shortly pubescent 2. *Pobeguinii*

Bracts thinly setose outside and long-ciliate, 8–10 mm. long; inflorescence up to 4 cm. long; leaves broadly oblanceolate, acuminate, acute at the base, 8–14 cm. long, thinly pubescent .. .. .. .. .. .. .. 3. *Paxiana*

Bracts thinly pubescent outside, 1·5 cm. long .. .. .. .. 5. *grandis*

Bracts more or less pointed :

Bracts about 5 mm. long, minutely setulose outside ; inflorescence 2–3 cm. long ; leaves narrowly obovate, obtusely pointed, 3–6 cm. long, 1–2·5 cm. broad, glabrous. with 3–4 pairs of lateral nerves .. .. .. .. .. 4. *congoensis*

Bracts 1·5 cm. long, ovate or ovate-lanceolate, slightly pubescent outside ; inflorescence up to 12 cm. long ; leaves obovate or elliptic and pointed at both ends, up to 18 cm. long and 7 cm. broad, with 8–10 pairs of lateral nerves ; petiole long 5. *grandis*

1. **Rungia dimorpha** *S. Moore* in Cat. Talb. Nig. Pl. 89. Erect branched herb or undershrub, stems pubescent at first, soon glabrous, drying blackish, with greenish flowers about ½ in. long in spikes with half-imbricate bracts.
S. Nigeria : Oban ! Exsicc.—*Talb.* 1528.

2. **R. Pobeguinii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Undershrub with pubescent woody stems and leaves, and woolly spikes of small flowers hidden in closely imbricate membranous-edged bracts.
French Guinea : ? locality ! Exsicc.—*Pobéguin* (no number).

3. **R. Paxiana** *C.B.Cl.*—F.T.A. 5 : 253. Herbaceous, branched, 4–6 ft. high in forest undergrowth, more or less pilose, woody below, with light-purple flowers less than ½ in. long in spikes with thin papery bracts.
Cameroons Mt., Buea, etc., 3,000–4,000 ft. (Sept., Nov., Jan.) ! Fernando Po (Dec.) ! Extends to Spanish Guinea. Exsicc.—*Mann* 588 ; 1968. *Dunlap* 10. *Preuss* 956.

4. **R. congoensis** *C.B.Cl.*—F.T.A. 5 : 254. A half-woody herb about 1 ft. high, with shortly pubescent branches, and very small flowers in short spikes with whitish-edged bracts.
S. Nigeria : Oban ! Extends to Congo. Exsicc.—*Talb.* 1391.

5. **R. grandis** *T. Anders.*—F.T.A. 5 : 252. *Justicia grandis* A. Chev. Bot. 500. Herbaceous undershrub up to 10 ft. high, woody below, with white, purple-veined flowers ¾ in. long in conspicuous spikes with broad green bracts with whitish papery edges.
French Sudan : Moussaia (Feb.) ! French Guinea : Kindia, etc. (Mar.) ! Sierra Leone : various localities ! S. Nigeria : Lagos ! Kradu Lake ! Awta ! Ikirun (Feb.) ! Lagos Colony ! Oban ! Extends to Congo and Uganda. Exsicc.—*Barter* 3274. *Winwood Reade. Moloney. Millson. Sc.Elliot* 3964 ; 4616. *Rowland. Millen* 59. *Farmar* 208. *Chev.* 459 ; 13145 ; 13375. (See Appendix).

## 42. **OREACANTHUS** Benth.—F.T.A. 5 : 176.

Branches shortly pubescent, with long internodes ; leaves subequal in each pair, elliptic, narrowed at both ends, long-acuminate, 15–20 cm. long, 4–7 cm. broad, thin, pubescent on the numerous lateral nerves below ; petiole pubescent ; panicle large and pyramidal ; calyx-lobes linear, 4 mm. long, viscid ; corolla 2-lipped, about 1·3 cm. long, the posticous subentire, the anticous 3-lobed ; stamens 2, long-exserted ; anthers 1-celled ; fruit 1·5 cm. long.. .. .. .. .. .. *Mannii*

**O. Mannii** *Benth.*—F.T.A. 5 : 177. Herbaceous undershrub 8–12 ft. or more high, with stems constricted and brittle above the nodes, and numerous white or light purple flowers ⅓ in. long.
Cameroons Mt., forming thickets in the mountain forest up to the timber-line, 7,000 ft. (Nov., Dec.) ! Exsicc.—*Mann* 1259 ; 1971. *Johnston* 64 ; 65. *Kalbreyer* 132. *Dunlap* 50.

## 43. **BRACHYSTEPHANUS** Nees—F.T.A. 5 : 177.

Branches glabrescent ; leaves subequal, ovate, broadly acuminate, very shortly cuneate at the base, about 10 cm. long and 6 cm. broad, ciliate, with numerous very minute short cystoliths below ; spikes sessile, dense, up to 7 cm. long ; bracts with very long ciliate tails ; calyx-segments about 1·5 cm. long, linear-subulate ; corolla 3 cm. long ; stamens 2, anthers 1-celled ; fruit 1 cm. long .. .. .. .. *longiflorus*

**B. longiflorus** *Lindau*—F.T.A. 5 : 178. Herbaceous undershrub 3 ft. high, with slender purple flowers nearly 1 in. long in dense spike-like panicles.
Cameroons Mt., Buea and vicinity, up to 5,500 ft. ! Fernando Po, 3,000 ft. (Dec.) ! Exsicc.—*Mann* 589. *Preuss* 890.

## 44. **HYPOESTES** R.Br.—F.T.A. 5 : 244.

Flowers in slender more or less unilateral spikes or substrobiliform :

Bracts densely long-setose-ciliate ; inflorescence strobiliform, up to 4 cm. long ; leaves linear-lanceolate, acute, 3–6 cm. long, 0·5–1 cm. broad, with numerous rod-like cystoliths ; corolla about 1·3 cm. long ; fruit 6 mm. long, glabrous 1. *cancellata*

Bracts not setose-ciliate ; inflorescence more or less spicate :

Bracts shortly pubescent :

Flowers not or hardly overlapping on the axes ; spikes slender ; calyx about 7 mm. long ; leaves oblong-elliptic, acute at both ends, 7–15 cm. long, 2·5–5 cm. broad, glabrous .. .. .. .. .. .. .. .. 2. *Talbotiae*

Flowers overlapping and crowded on the axes ; spikes stiff and crowded ; leaves ovate-elliptic to broadly oblanceolate, gradually acuminate, up to 15 cm. long and 6 cm. broad, nearly glabrous .. .. .. .. .. 3. *Barteri*

Bracts covered with long slender hairs :

Spikes slender, unilateral, more or less paniculate ; leaves elliptic, broadly acuminate, shortly cuneate at the base, 7–14 cm. long, 3–6 cm. broad, with minute rod-like cystoliths on the lower surface .. .. .. .. .. 4. *violaceo-tincta*

Spikes composed of whorls of flowers, stout ; leaves long-petiolate, acuminate, shortly cuneate at the base, 8–15 cm. long, 5–7 cm. broad, with about 8 pairs of lateral nerves ; corolla about 1·5 cm. long .. .. .. 5. *verticillaris*

Flowers in whorls or clusters :

Bracts with long slender tails at the apex, slightly pubescent, up to 1·5 cm. long ;

corolla-tube 1·5 cm. long ; stamens long-exserted ; leaves ovate-elliptic, gradually acuminate, broadly cuneate at the base, up to 15 cm. long and 5 cm. broad, thinly pilose on the midrib below .. .. .. .. .. .. .. 6. *insularis*
Bracts rounded or broadly pointed at the apex ; flowers few in pedunculate clusters :
Bracts rounded at the apex, obovate-oblanceolate, about 1 cm. long, shortly setose-pilose ; leaves broadly ovate, broadly acuminate, 3–5 cm. long, 1·5–3 cm. broad, setose-pilose on both surfaces ; petiole slender, up to 3 cm. long .. 7. *triflora*
Bracts broadly acuminate, oblanceolate, about 7 mm. long, puberulous ; leaves as above.. .. .. .. .. .. .. .. .. .. 8. *rosea*
Bracts acuminate, with long slender hairs in the upper part .. 5. *verticillaris*

1. **Hypoestes cancellata** *Nees*—F.T.A. 5 : 246 ; Chev. Bot. 501. Herb 1–3 ft. high, with slightly pubescent sulcate stems and flowers ⅔ in. long, bright red, red- or blue-purple.
French Guinea : between Boulivel and Dalaba (Sept.). Sierra Leone : Leicester Peak (Dec.) ! Freetown (Dec.) ! Scarcies R., Wallia (Feb.) ! Kambia (Dec.) ! Kumrabai (Dec., Jan.) ! Gorango (Dec.) ! Also in Upper Nile Land, Congo Basin and Angola. Exsicc.—*Sc. Elliot* 3843 ; 4265. *Deighton* 262 ; 522 ; 823.
2. **H. Talbotiae** *S. Moore* in Cat. Talb. Nig. Pl. 88. Herbaceous undershrub decumbent and rooting below, with ascending nearly glabrous branches, and bright red flowers nearly 1 in. long in narrow spicate inflorescences.
S. Nigeria : Oban ! Exsicc.—*Talb.* 2005.
3. **H. Barteri** *T. And.*—F.T.A. 5 : 246. Erect herb 2–4 ft. high, with pithy sulcate stems shortly pubescent, and simple or paniculate spikes of flowers pale red-purple or yellowish ⅔–1 in. long.
S. Nigeria : Lagos ! Epe, Kradu Lake ! Ubulubu (Dec.) ! Idumuye (Dec.) ! Oban ! Victoria, common in plantations (Feb.) ! Cameroons Mt. : Buea (Jan.) ! Exsicc.—*Barter* 3285. *Millen* 35. *Dalz.* 8220. *Dunlap* 130. *Buchholz.*
4. **H. violaceo-tincta** *Lindau*—F.T.A. 5 : 251. Herbaceous undershrub, with whitish flowers ⅓–½ in. long numerous in axillary and terminal panicled spikes.
Sierra Leone : Bafodeya (Apr.) ! Togo : Misahöhe, in forest (Apr., Nov.) ! Also in Cameroons. Exsicc.—*Sc. Elliot* (no number). *Baumann* 476. *Mildbraed* 7315.
5. **H. verticillaris** *R.Br.*—F.T.A. 5 : 250 ; Chev. Bot. 502. *H. Preussii* Lindau. Herbaceous undershrub 1–3 ft. high woody below, pubescent becoming glabrous, with white, purple streaked flowers ½–¾ in. long in numerous axillary spikes usually covered with pale spreading hairs.
French Sudan : Badinko ; Balani ; Djenné. Senegal : Casamance, etc. ! French Guinea : between the Santa and Timbo. Sierra Leone. Gold Coast : Assin Yan Kumasi (Jan.) ! Krepi Plains (Jan.) ! Agogo, Ashanti Akim (Dec.) ! Togo : Alafanyo ! Amedzofwe (Feb.) ! N. Nigeria : Kontagora (Dec.) ! Bauchi Plateau, Naraguta (Nov.) ! Vom, 3,000–4,500 ft. ! S. Nigeria : Lagos ! Awka ! Idumuye (Dec.) ! Ibuzo (Nov.) ! Eket ! Oban ! Cross R. (Jan.–Mar.) ! Rio del Rey ! Cameroons Mt. Buea ! Extends to Angola and in tropical Africa generally and Arabia. Exsicc.—*Heudelot* 552. *Cummins* 66. *Millen* 54. *Johnston. Johnson* 543. *Dalz.* 187. *Lely* 702. *Dent Young* 198. *Krause. Preuss* 755. (See Appendix).
6. **H. insularis** *T. Anders.*—F.T.A. 5 : 246. *H. Staudtii* Lindau. Habit of the last, sparsely hairy, with light purple flowers 1 in. long in rather dense axillary clusters.
S. Nigeria : Cross R. (Dec.) ! Oban ! Rio del Rey ! Cameroons Mt. : 2,500 ft. (Dec.) ! Buea (Dec.) ! Fernando Po (Jan.) ! Also in French Cameroons and Gabon. Exsicc.—*Mann* 179 ; 1951. *Johnston. Holl.* 182. *Talb.* 1409 ; 2019. *Maitland* 143.
7. **H. triflora** *Roem. & Schult.*—F.T.A. 5 : 247 ; Chev. Bot. 502. A straggling herb with ribbed laxly pilose stems, and pink or nearly white flowers ¾ in. long few in whorls with broad obtuse bracts.
Cameroons Mt. up to 7,000 ft., Mann's Spring, etc. (Dec.–Feb.) ! Fernando Po, 5,000 ft. (Dec.) ! Extends to Angola, Abyssinia and E. Africa. Exsicc.—*Mann* 580 ; 1979. *Dunlap* 36 ; 77. *Preuss* 745.
8. **H. rosea** *Beauv.* Fl. Owar. 2 : 67, t. 100, fig. 1.—F.T.A. 5 : 248. Herbaceous, slightly pubescent, with pink flowers ¾ in. long.
Togo. S. Nigeria : Benin. Cameroons Mt. : west of Buea (Jan.) ! Exsicc.—*Preuss* 599.

## 144. VERBENACEAE

Herbaceous or woody, often with quadrangular branchlets. Leaves usually opposite or whorled, simple or compound ; stipules absent. Flowers hermaphrodite, zygomorphic. Calyx 4–5-lobed or toothed, persistent. Corolla gamopetalous, tubular, 4–5-lobed, lobes imbricate. Stamens on the corolla, 4 or rarely 2 or 5 ; anthers 2-celled, cells often divergent, opening lengthwise. Ovary superior, 2–8-celled, often 4-celled. Style terminal, simple ; ovules solitary or paired, erect or rarely pendulous. Fruit a drupe or berry. Seeds with straight embryo and scanty or no endosperm.

Perfect stamens 4, often didynamous :
Flowers spicate or racemose :
Ovary 4-celled .. .. .. .. .. .. .. .. .. 1. **Duranta**
Ovary 2-celled :
Fruit fleshy .. .. .. .. .. .. .. .. .. 2. **Lantana**
Fruit dry :
Fruit of two bony pyrenes.. .. .. .. .. .. .. 3. **Lippia**
Fruit a compressed, 2-valved capsule .. .. .. .. 4. **Avicennia**
Flowers cymose :
Fruit dry ; leaves always simple :
Pyrenes 4, 1-celled .. .. .. .. .. .. .. .. 5. **Premna**
Pyrene 1, 4-celled .. .. .. .. .. .. .. 6. **Clerodendron**
Fruit a fleshy drupe ; leaves usually digitately compound .. .. 7. **Vitex**
Perfect stamens 2, staminodes 2 ; flowers spicate, more or less immersed in the often swollen rachis .. .. .. .. .. .. .. .. 8. **Stachytarpheta**

### 1. DURANTA Linn.—F.T.A. 5 : 287.

Branchlets terete, glabrous ; leaves obovate-elliptic, shortly pointed, cuneate at the base, up to 8 cm. long and 4 cm. broad, glabrous, with about 5 pairs of lateral nerves ; petiole about 1 cm. long ; racemes paniculate, slender, in the upper leaf-axils ; pedicels 3–4 mm. long ; calyx tubular, 5 mm. long, puberulous, with minute teeth ; corolla puberulous, twice as long as the calyx ; fruit globose, 1 cm. diam. *repens*

**D. repens** *Linn.* Sp. Pl. 637. *D. Plumieri* Jacq.—F.T.A. 5 : 287 ; Bot. Reg. t. 244 ; Holl. 3 : 518 ; Chev. Bot. 504. A shrub 5–10 ft. high, with bluish-lilac flowers ⅓ in. or more long in copious terminal racemes forming a panicle, and bright yellow drupes the size of a pea.

A native of tropical America, grown as an ornamental shrub !

### 2. LANTANA Linn.—F.T.A. 5 : 275.

Bracts ovate ; flowers more or less spicate, at least in fruit :

Stems rather long-setose-pilose with spreading hairs ; leaves usually 3 to each node, ovate-lanceolate, acute, up to 12 cm. long and 5 cm. broad, shortly pubescent below, serrate .. .. .. .. .. .. .. .. .. .. 1. *trifolia*

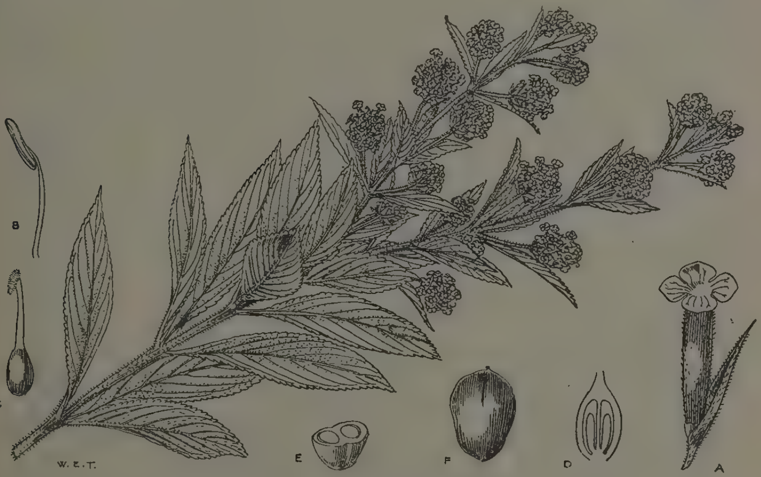

FIG. 270.—LANTANA SALVIFOLIA *Jacq.* (VERBENACEAE).

A, flower and bract. B, stamen. C, pistil. D, longitudinal section of ovary. E, cross-section of ovary. F, fruit.

Stems shortly pubescent ; leaves usually 2 to each node, ovate-lanceolate, crenate-serrate, up to 12 cm. long and 4·5 cm. broad, scabrid-bullate above, softly tomentose-pubescent below .. .. .. .. .. .. .. .. 2. *salvifolia*

Bracts linear-lanceolate ; flowers capitate ; stems usually prickly ; leaves ovate or ovate-lanceolate, crenate-serrate, up to 8 cm. long and 5 cm. broad, scabrid above, shortly pubescent below ; corolla about 8 mm. long, shortly pubescent outside 3. *Camara*

1. **Lantana trifolia** *Linn.*—F.T.A. 5 : 277 ; Holl. 3 : 517. Harshly hairy undershrub, with small pink or lilac flowers with yellow eye in axillary pedunculate heads becoming oblong spikes in fruit. " Wild Sage."

S. Nigeria : near Lagos ! A native of tropical America. Exsicc.—*Rowland.*

2. **L. salvifolia** *Jacq.*—F.T.A. 5 : 276 ; Holl. 3 : 517. *L. viburnoides* Baker—F.T.A. 5 : 276, partly, not of Vahl. *L. antidotalis* A. Chev. Bot. 502, not of Sch. & Thonn. *L. trifolia* A. Chev. Bot. 502, not of Linn. A much-branched undershrub 3–6 ft. high with wrinkled leaves, occasionally ternate, red or lilac flowers in globose spikes which become ovoid and about 1 in. long, and red-purple or violet fruits.

French Sudan : Folo (May) ! Sierra Leone : Kanya (fr. Oct.) ! Ivory Coast : Middle Sassandra, savannah between Kouroukoro and Touna (May) ! Mankono (June) ! Gold Coast : Kwahu Tafo (May) ! N. Terr., Salaga (Apr.) ! N. Nigeria : Nupe ! Lokoja (Oct.) ! Abinsi (Mar., Sept.) ! Yola (July) ! Bauchi Plateau, Pankshin, 5,100 ft. (July) ! Nabardo (May) ! S. Nigeria : Lagos Colony ! Throughout tropical Africa to S. Africa and India. Exsicc.—*Barter* 1286. *Phillips* 55. *Dawodu* 182. *N. W. Thomas* 3031. *Dalz.* 56 ; 114 ; 695 ; 696. *Lely* 213 ; 431. *Krause. Chev.* 835 bis ; 21801 ; 21901.

3. **L. Camara** *Linn.*—F.T.A. 5 : 275 ; Stapf 642 ; Holl. 3 : 516 ; Chev. Bot. 502. Erect much-branched square-stemmed shrub with hooked prickles, and red and yellowish-white flowers in flat-topped heads 1 in. across.

Cosmopolitan in the tropics ! (See Appendix).

### 3. **LIPPIA** Linn.—F.T.A. 4, 2 : 278.

Flower-heads solitary on slender axillary peduncles, up to 2·5 cm. long, cylindric; bracts ovate-orbicular, shortly acuminate, pubescent; leaves oblanceolate, dentate in the upper third, up to 3 cm. long and 8 mm. broad, minutely pubescent 1. *nodiflora*

Flower-heads crowded and corymbose, globose or ellipsoid, about 1 cm. long; bracts as above but densely tomentose; leaves broadly lanceolate to oblanceolate, subacute, up to 15 cm. long and 5 cm. broad, closely serrulate, finely tomentellous below, with prominent tertiary nerves .. .. .. .. .. .. .. 2. *adoensis*

1. **L. nodiflora** *Rich.*—F.T.A. 5 : 279; Chev. Bot. 503. Prostrate, rooting at the nodes, or ascending from a half-woody base, nearly glabrous, with small lilac or pinkish flowers in dense spikes ⅓–1 in. long.
French Sudan: Daouna near Timbuktu (Aug.)! San (July)! Senegal! N. Nigeria: Sokoto, in wet places (July)! Bornu, by Lake Chad (Dec.)! In the tropics and subtropics generally. Exsicc.—*Heudelot. Elliott* 147. *Dalz.* 366.

2. **L. adoensis** *Hochst.*—F.T.A. 5 : 280; Holl. 3 : 517; Chev. Bot. 503. *L. rugosa* A. Chev. Bot. 503. An erect branched undershrub 4–7 ft. high, shortly pubescent, with wrinkled leaves in whorls of 2–4, and small white or lilac flowers with yellow centre in numerous small heads; chiefly in grass savannah.
Senegal and French Sudan to N. Nigeria and Lagos Colony! Extends to E. and S. Tropical Africa. Exsicc.—*Heudelot* 103. *Thierry* 227. *Barter* 768. *Baikie* 11. *Ingram. Brown-Lester* 4; 28. *Sc. Elliot* 4262; 4285; 4878. *Millen* 143. *Johnson* 542; 584. *Dalz.* 177. *Chev.* 20410. *Mildbraed* 7238.

### 4. **AVICENNIA** Linn.—F.T.A. 5 : 331.

Branchlets puberulous; leaves lanceolate to oblong-lanceolate, or rarely narrowly elliptic, subacute, acute at the base, up to 18 cm. long and 8 cm. broad, minutely and closely pitted above, with a close grey scurf below; lateral nerves 10–12 pairs, looped and forming an intra-marginal nerve, raised on both surfaces; flowers crowded at the end of short peduncles, these often forming a small panicle; bracts imbricate, ovate, shortly pointed, about 4 mm. long, tomentellous; fruit obliquely ellipsoid, 2·5 cm. long, beaked, tomentellous .. .. .. .. .. .. *nitida*

**A. nitida** *Jacq.* Enum. Pl. Carib. 25. *A. africana* P. Beauv. Fl. Owar. 1 : 80, t. 47.—F.T.A. 5 : 331; Stapf 643; Holl. 3 : 527; Chev. Bot. 510. A shrub or tree up to 40 ft. high in mangrove thickets, with small white flowers, the corolla-lobes usually 4.
Senegal to Cameroons and Fernando Po! Extends to Portuguese Congo. Exsicc.—*Döllinger* 73. *Roger* 75. *Brunner* 1. *Don. T. Vogel* 101. *Barter* 46. *Mann* VII.; 231. *Sc.Elliot* 4120. *Johnson* 984. *Whyte. Macgregor* 341. *Talb.* (no number). *Chev.* 2760. (See Appendix).

### 5. **PREMNA** Linn.—F.T.A. 5 : 287.

Leaves narrowed to the base:

Leaves pilose-pubescent below:

Leaves broadly obovate, acutely acuminate, up to 20 cm. long and 10 cm. broad, with 8–10 pairs of lateral nerves; corymbs terminal, many-flowered; calyx pubescent, enlarging and nervose in fruit; fruit obovoid, 1 cm. long 1. *hispida*

Leaves elongate-obovate-oblanceolate, long and acutely acuminate, 25–30 cm. long, 6–9 cm. broad, thin, denticulate in the upper half, pilose especially on the midrib below, with 10–14 pairs of lateral nerves; petiole 1 cm. long, hirsute; cyme small and subsessile, rusty-pilose except the pedicels; calyx very small, glabrous 2. *macrophylla*

Leaves glabrous below, oblong, acutely acuminate, 7–8 cm. long, 2·5–3 cm. broad, with about 4 pairs of lateral nerves; petiole 1·5–2 cm. long; corymbs small, few-flowered .. .. .. .. .. .. .. .. .. 3. *Milnei*

Leaves rounded at the base:

Leaves ovate:

Leaves entire or nearly so, 9–12 cm. long, 6–9 cm. broad, softly pubescent on the nerves below, with lax parallel tertiary nerves; petiole 3–5 cm. long, softly tomentellous; flowers numerous and small in a divaricate tomentose panicle 4. *Zenkeri*

Leaves crenate, cuspidate-acuminate, cordate or rounded at the base, 7–9 cm. long, 4–6 cm. broad, sparingly setulose above, softly tomentose to thinly pubescent below; petiole 2–3 cm. long, pubescent; panicles rather small with numerous small flowers .. .. .. .. .. .. .. .. 5. *quadrifolia*

Leaves broadly oblong to oblong-elliptic, rounded, and slightly cordate at the base, 5–15 cm. long, 3·5–9 cm. broad, thinly pubescent on the nerves below, glabrescent:

Calyx-lobes as long or longer than the tube; corolla-tube 7 mm. long; cymes spreading up to 7 cm. diam.; petioles fairly stout, rusty-pubescent 6. *macrosiphon*

Calyx-teeth very short, deltoid; corolla-tube 4–5 mm. long; cymes forming fairly dense corymbs 3–5 cm. diam.; petioles slender, glabrescent .. .. 7. *lucens*

1. **Premna hispida** *Benth.*—F.T.A. 5 : 290; Stapf 643; Chev. Bot. 504. A hairy shrub or small tree with small white flowers in hairy corymbs.
Senegal: Casamance, etc.! French Guinea to Liberia: fairly common! Ivory Coast: Bingerville and neighbourhood! Nzi, Diamankrou! Gold Coast: Kwahu Plateau (May)! Togo: Amedzofwo (fr. Feb.)! Exsicc.—*Heudelot* 760. *Don. Barter* (no number). *Sc. Elliot* 4521; 5833. *Garrett* 16. *Whyte.* (See Appendix).

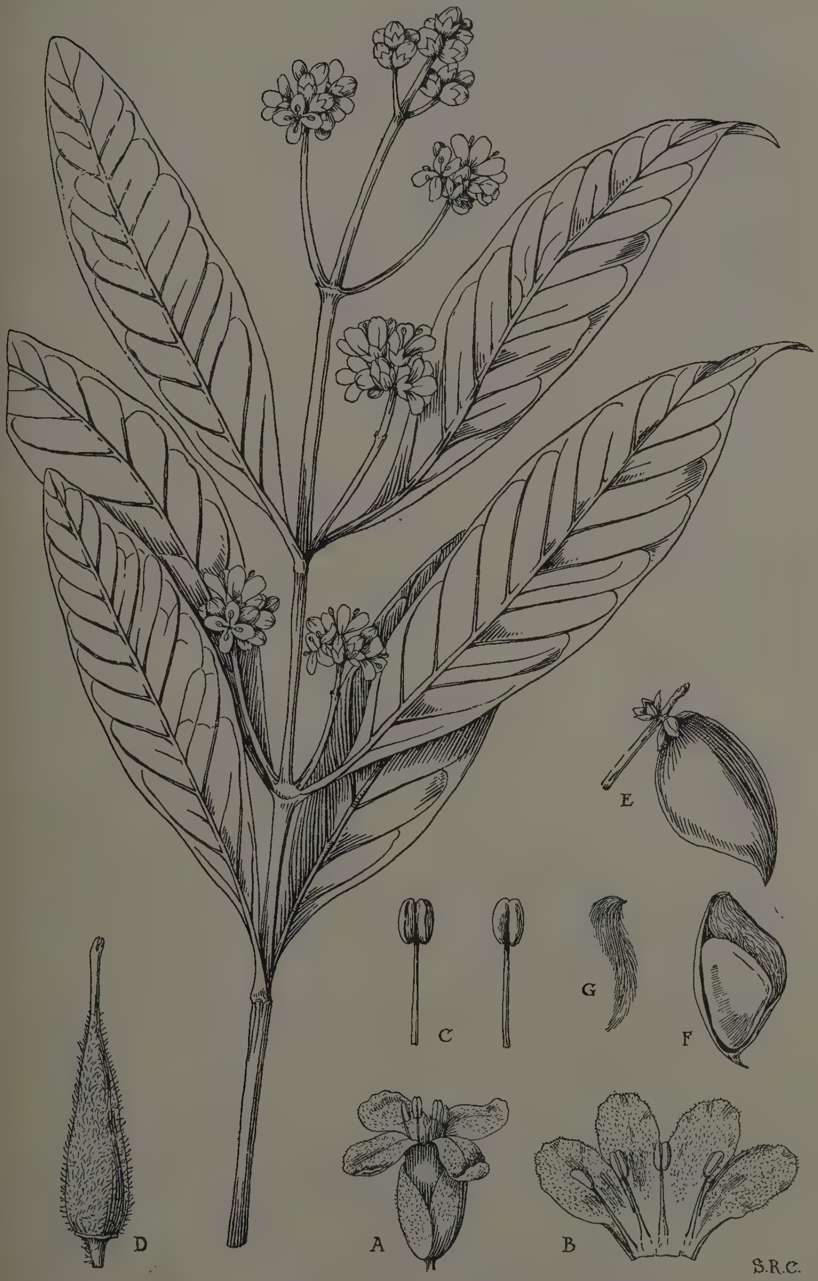

FIG. 271.—AVICENNIA NITIDA *Jacq.* (VERBENACEAE).
A, flower. B, corolla laid open. C, stamens. D, pistil. E, fruit. F, fruit in longitudinal section. G, radicle.

2. **P. macrophylla** *A. Chev.* Bot. 505, name only. A shrub 2–3 ft. high, densely rusty-pilose on branchlets and midribs, with long leaves and small white flowers.
Ivory Coast: Cavally Basin, Oubi country, Kéeta (July)! Tépo country, Grabo and environs (July)! Exsicc.—*Chev.* 19366; 19654.

3. **P. Milnei** *Baker*—F.T.A. 5 : 291. A shrub with glabrous branchlets and small white flowers in a pubescent slender-branched corymbose panicle.
Fernando Po! Exsicc.—*Milne.*

4. **P. Zenkeri** *Gürke* in Engl. Bot. Jahrb. 33 : 292. A much-branched shrub a few feet high, with stems rusty-pubescent at first, and small white flowers in copious panicles.
French Guinea: Timbo! Togo: Basari! Also in Cameroons. Exsicc.—*Pobéguin* 741. *Kersting* I. 1121.

5. **P. quadrifolia** *Schum. & Thonn.*—F.T.A. 5 : 289; Chev. Bot. 505. *P. gracilis* A. Chev. Bot. 504. *Gaertnera ferruginea* A. Chev. Bot. 444, name only. Erect much-branched shrub 4–6 ft. high, shortly pubescent on the branchlets and inflorescence, with small white flowers in thyrsoid panicles.
Ivory Coast: Baoulé-Nord, between Bouaké and Mt. Lémélébou (July)! Baoulé-Sud, Toumodi (Aug.)! Middle Cavally, Niénokoué! Gold Coast: common on Accra Plains (Feb.–June)! Aburi Hills (June)! S. Nigeria: Abeokuta! and ? locality! Exsicc.—*T. Vogel* (no number). *Barter* 3358. *Dalz.* 144; 8263. *Deighton* 594. *Lloyd Williams* 296. *Chev.* 19457; 22101; 22392.

6. **P. macrosiphon** *Baker*—F.T.A. 5 : 290. A shrub more or less scrambling or sometimes climbing, rusty-pubescent and with rather coarsely hairy petioles and small white flowers in short corymbose panicles.
S. Nigeria: Akassa (Sept.)! Oban! Eket! Victoria! Buea! Calabar! Cameroons R. (Jan.) Also in St. Thomas Island and ? Fernando Po. Exsicc.—*Mann* 486; 2213. *Thomson* 28. *Talb.* 1491; 3122. *Maitland* 587; 980.

7. **P. lucens** *A. Chev.* in Bull. Soc. Bot. Fr., Mém. 8d : 192; Bot. 505. Habit of the last but glabrescent, with small white flowers.
Ivory Coast: Baoulé-Nord, in savannah woodland near a marsh, Diahbo village (July)! Exsicc.—*Chev.* 22071.

## 6. **CLERODENDRON** Linn.—F.T.A. 5 : 292.

*Flowers in loose branched corymbose or paniculate cymes or rarely subsolitary (not in heads):

Stems subherbaceous, arising from a rhizome; leaves verticillate; stamens long-exserted, declinate:

Leaves sessile, more or less narrowed to the base, broadly oblanceolate or elliptic-oblanceolate, serrate or crenate in the upper half, up to 14 cm. long and 6 cm. broad, pubescent to nearly glabrous below: flowers in a leafy panicle; calyx widely cupular, dentate .. .. .. .. .. .. .. 1. *Fleuryi*

Leaves petiolate:

Leaves softly tomentose below, obovate-elliptic, 5–6 cm. long and about 3 cm. broad; panicle laxly divaricate; pedicels thinly pilose; calyx widely turbinate, 6 mm. long, slightly ciliate; corolla about 3 cm. long .. 2. *tomentellum*

Leaves glabrous below except on the nerves, ovate-elliptic, up to 10 cm. long and 6 cm. broad, subentire; panicle as above; pedicels very shortly puberulous; calyx puberulous; corolla 2 cm. long .. .. .. .. 6. *violaceum*

Stems woody, erect or scandent; leaves opposite or rarely verticillate:

Calyx-segments large, ovate or ovate-lanceolate, 1·5–2 cm. long:

Leaves glabrous below, ovate elliptic, acutely acuminate, rounded or shortly cuneate at the base, up to 16 cm. long and 8 cm. broad, very thin, with 4–5 pairs of lateral nerves; flowers laxly cymose; calyx-segments ovate, acute; corolla slightly longer than the calyx .. .. .. .. .. .. 3. *Thomsonae*

Leaves spreadingly pilose below, broadly-ovate-elliptic, shortly acuminate, rounded at the base, 10–15 cm. long, 7–10 cm. broad; lateral nerves about 3 pairs, ascending; panicle narrow; calyx-segments triangular-lanceolate, thinly pubescent 4. *eketense*

Calyx-segments much smaller than above:

Leaves densely tomentose below, broadly ovate, deeply cordate, about 6 cm. long and 5 cm. broad, densely setose above; petiole 1 cm. long; cymes few-flowered; calyx 1 cm. long, lobes triangular, very acute; corolla-tube 3 cm. long, lobes 1·5 cm. long; stamens long-exserted .. .. .. .. .. 5. *Greyi*

Leaves at most thinly pubescent or pilose below:

Limb of the corolla larger and longer than the tube, oblique (very conspicuous in bud); flowers paniculate; leaves ovate-elliptic, up to 10 cm. long and 6 cm. broad; pedicels shortly puberulous; calyx puberulous; fruit obovoid, bilobed 6 *violaceum*

Limb of the corolla much shorter than the tube, the latter more or less straight:

Flowers very small, the corolla-tube not more than 1 cm. long:

Branches glabrous:

Leaves cordate at the base, suborbicular, abruptly acuminate, about 6–8 cm. diam., black when dry, glabrous; petiole 4·5 cm. long; cymes corymbose, subsessile; calyx and corolla as in the following species 7. *melanocrater*

Leaves not cordate:

Calyx with broad short triangular lobes, enlarging in fruit and saucer-like; leaves oblong-elliptic, gradually and very acutely acuminate, 8–12 cm. long, up to 6 cm. broad, finely punctate below; cymes corymbose; corolla-tube 1 cm. long; fruit bilobed, 1 cm. long .. .. .. .. 8. *volubile*

Calyx with short lanceolate lobes not enlarging in fruit; leaves as above but in whorls of 4, smaller, tailed-acuminate, minutely dotted below; cymules numerous and racemosely arranged on the main axis; corolla-tube 4 mm. long .. .. .. .. .. .. .. 9. *formicarum*

Branches tomentellous or tomentose:

Inflorescence an elongated panicle with few-flowered side branches, tomentellous all over; pedicels up to 1·5 cm. long; calyx enlarging in fruit, lobes triangular; leaves ovate-elliptic, abruptly acuminate, unequal-sided at the base, 7–10 cm. long, 4–5·5 cm. broad, gland-dotted below; corolla tomentose in bud .. .. .. .. .. .. .. .. 10. *streptocaulon*

Inflorescence a corymbose or slightly pyramidal cyme:

Leaves cordate at the base, broadly elliptic-ovate, abruptly acuminate, 8–14 cm. long, 6–8 cm. broad, pilose on all the nerves below; flowers clustered at the ends of elongated branches of the cyme; corolla-limb pubescent 11. *polycephalum*

Leaves not cordate at the base, about 15 cm. long and 8 cm. broad, pilose only on the midrib and lateral nerves below; flowers more or less as above 12. *Barteri*

Flowers larger, the corolla-tube 1·5 cm. long or more:

Calyx about 1 cm. long, lobes triangular, acute, glabrous; cymes long-pedunculate, few-flowered; leaves ovate-elliptic, acutely acuminate, 8–12 cm. long, 5–7 cm. broad, glabrous; stamens long-exserted .. .. .. 13. *scandens*

Calyx at most 0·8 cm. long:

Calyx-lobes narrowly lanceolate, acute; leaves ovate-elliptic, acutely acuminate, rounded at the base, 10–15 cm. long, up to 9 cm. broad, punctate below; corolla-tube 2 cm. long; stamens long-exserted .. .. 14. *splendens*

Calyx lobes shortly triangular:

Calyx tubular, 8 mm. long; flowers rather crowded in the cymules; leaves elliptic, acuminate, rounded or cuneate at the base, 9–14 cm. long, up to 7 cm. broad, minutely punctate below; corolla-tube 1·5 cm. long, glabrous 15. *Buchholzii*

Calyx short and cupular, 3–4 mm. long; flowers lax, the ultimate pedicels about 2 cm. long; leaves as above, reticulate; corolla-tube 1·5 cm. long, pubescent .. .. .. .. .. .. .. 16. *bipindense*

**Flowers in head-like clusters or cymes:

Stems herbaceous, erect, deeply channelled; leaves ovate, acuminate, obtusely dentate, 6–9 cm. long, 4–6 cm. broad, puberulous on the nerves below; petiole up to 5 cm. long; flowers crowded; calyx deeply divided into linear segments about 1 cm. long; corolla-tube 3 cm. long, limb 2 cm. long .. .. 17. *eupatorioides*

Stems woody, erect or scandent:

Calyx tubular, not lobed beyond the middle:

Calyx-lobes shortly triangular or ovate, glabrous or shortly tomentose:

Leaves broadly narrowed to the base, obovate-elliptic, dentate, about 15 cm. long and 6–8 cm. broad, strongly reticulate; heads many-flowered; corolla-tube 3·5 cm. long .. .. .. .. .. .. .. .. 18. *Bakeri*

Leaves rounded-cordate at the base, thinly pilose on both surfaces, about 15 cm. long and 11 cm. broad, entire; heads few-flowered; calyx glandular-hispid; corolla-tube 5 cm. long .. .. .. .. .. .. 19. *Welwitschii*

Calyx-lobes narrowly lanceolate or linear, densely long-pilose:

Branches shortly pubescent, woody, stramineous; leaves elliptic, softly villous on the nerves below .. .. .. .. .. .. .. 20. *acerbianum*

Branches long-pilose; leaves ovate or elliptic, often cordate at the base, woolly-tomentose or pilose below .. .. .. .. .. 21. *sinuatum*

Calyx with a very short tube divided below the middle into large ovate lobes about 1·5 cm. long; leaves broadly ovate to elliptic, up to 18 cm. long and 10 cm. broad, pilose on the nerves below; flowers crowded; corolla-tube slender, 6–10 cm. long; fruit bilobed, black and shining .. .. .. .. 22. *capitatum*

1. **Clerodendron Fleuryi** *A. Chev.* in Bull. Soc. Bot. Fr. Mém. 8d : 191; Bot. 508. *C. Lelyi* Hutch. Erect undershrub 2–4 ft. high, strongly angled, with 3-whorled leaves and blue-purple flowers ⅔ in. long, the upper lobes of corolla white.
Ivory Coast: Baoulé-Nord, between Langouassou and Fétékro (July)! N. Nigeria: Bauchi Plateau, Mongu, 4,300 ft. (July)! Vom! Kilba, Yola Prov. (July)! Exsicc.—*Lely* 384. *Dent Young* 205. *Dalz.* 205. *Chev.* 22160.
2. **C. tomentellum** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Undershrub, densely grey- or yellow-tomentose on the young parts, with conspicuous purple flowers 1 in. or more long.
N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft.! Exsicc.—*Dent Young* 205a.
3. **C. Thomsonae** *Balf. f.* in Trans. Bot. Soc. Edinb. 7 : 265, t. 7; 580, t. 16—F.T.A. 5 : 303; Holl. 3 : 524. A climbing shrub, sometimes at first suberect, nearly glabrous, with striking light crimson corolla in a white calyx 1–1½ in. long.
Senegal: Dakar (Jan.)! N. Nigeria: Kabba (Oct.)! Kotorkarifi, banks of Niger (Dec.)! S. Nigeria: Benin district, Ifon (June), Osse R. (Jan.)! Angiama! Eket! Calabar (Feb.)! Cross R. (July)! Exsicc.—*Thomson* (cult.). *Barter* 2093. *Mann* 2327. *Johnston.* *Elliott* 219. *Parsons* 111; 159. *Foster* 200. *Talb.* 3037. *Chev.* 3437. (See Appendix).
4. **C. eketense** *Wernham* in Journ. Bot. 1914 : 32. A softly pubescent climbing shrub, with rather crowded thyrsoid inflorescence, the corolla scarcely exserted from the calyx ½–⅝ in. long.
S. Nigeria: Eket! Exsicc.—*Talb.* 3393.

5. **C. Greyi** *Baker*—F.T.A. 5 : 308. A shrub with finely brown-pubescent branchlets, and narrow tubular flower (pinkish ?) 1½–1¾ in. long.
? locality ! Exsicc.—*Grey*.

6. **C. violaceum** *Gurke* in Engl. Bot. Jahrb. 28 : 303 ; F.T.A. 5 : 520. *C. Kalbreyeri* Baker. *C. indeniense* A. Chev. Bot. 508, name only. *C. Noiroti* A. Chev. Bot. 508. A soft-wooded shrub, more or less straggling or climbing, with conspicuous blue-purple flowers, or one corolla-lobe blue-purple the others white, in paniculate cymes.
French Guinea : Labé, etc. ! Dalaba-Diaguissa (Mar.) ! Sierra Leone : Hill Station ! Koinadugu (Apr.) ! Ivory Coast : Abradines on the Lower Comoé (Mar.) ! Gold Coast : S. Ashanti, Dedeswa (Mar.) ! Mampong Scarp (Mar.) ! Atuntumbrim (Oct.) ! Akwapim ! S. Nigeria : Lagos ! Egure (Mar.) ! Cameroons Mt., ? locality ! Also in French Cameroons. Exsicc.—*Rowland*. *Millson*. *Smythe* 105 ; 262. *Chipp* 146. *Dalz.* 8402. *Deighton* 198. *Vigne* 1066. *Kalbreyer* 94. *Chev.* 12393 ; 17566. (See Appendix).

7. **C. Melanocrater** *Gürke*—F.T.A. 5 : 299. A climbing shrub, glabrous or puberulous on the young branchlets and inflorescence, with small flowers ⅓ in. long, the calyx white, the corolla brownish-yellow, all drying black.
Cameroons Mt. : Likomba Plantation (Oct.) ! Also in Congo Basin and East Africa. Exsicc.—*Mildbraed* 10510.

8. **C. volubile** *Beauv.* Fl. Owar. 1 : 52, t. 32 ; F.T.A. 5 : 297 ; Holl. 3 : 524 ; Chev. Bot. 509. A climbing shrub, glabrous except the inflorescence, strongly odorous, with the leaf-petiole jointed at the base, and numerous rather small greenish-white flowers yellow in the throat, ⅓–½ in. long.
French Guinea to Ivory Coast : common ! Gold Coast : Kwahu Prahsu (Feb.) ! Togo : Amedzofwe (Feb.) ! N. Nigeria : Gudi, south of Kalanchan (Mar.) ! S. Nigeria : Lagos and neighbourhood ! Epe ! Lagos Colony, Abeokuta, etc. ! Ubuluku (Dec.) ! Aguku ! Eket, along rivers ! Extends to Gabon and Congo. Exsicc.—*Don.* *Barter* 3275. *Irving* 87 ; 90. *Moloney*. *Sc. Elliot* 4424. *Millen*. *Smythe* 203. *Dalz.* 8109. *Vigne* 1627. *Talb.* (no number). (See Appendix).

9. **C. formicarum** *Gürke*—F.T.A. 5 : 297 ; Holl. 3 : 523. A climbing shrub with slender branchlets finely pale brown-pubescent when young, with small white flowers ¼ in. long, the inflorescence a subumbellate panicle.
S. Nigeria : Eket ! Calabar (July) ! Extends to Angola, Upper Belgian Congo and E. Africa. Exsicc.—*Holl.* 53. *Talb.* 3077.

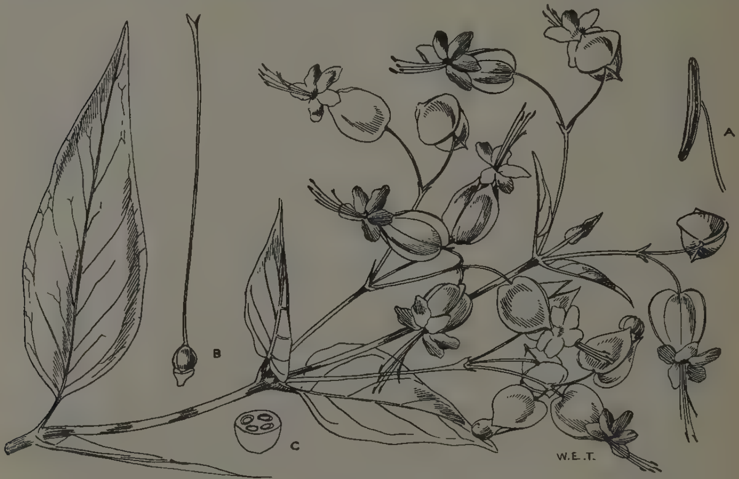

FIG. 272.—CLERODENDRON THOMSONAE *Balf. f.* (VERBENACEAE).

A, anther. B, pistil. C, cross-section of ovary.

10. **C. streptocaulon** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Habit of *C. volubile* but softly pubescent on the branchlets, and the inflorescence forming a rather long panicle, the lateral cymes of which arise above the axils of the bracts ; leaves jointed and leaving a hardened base.
Sierra Leone : Samu country, in woods (Dec.) ! Sasseni, Benna (Jan.) ! Kitchom, a straggly bush 4–7 ft. high, by a salt marsh (Jan.) ! S. Nigeria : Lagos, Ikoyi, in swampy forest (Dec., Jan.) ! Exsicc.—*Sc. Elliot* 4237 ; 4417. *Dalz.* 1249. *Deighton* 962.

11. **C. polycephalum** *Baker*—F.T.A. 5 : 300 ; Holl. 3 : 524 ; Chev. Bot. 508. Erect stout-branched shrub or half-climbing, densely rusty-hairy, the leaves jointed at the base and leaving hardened blunt spines ; flowers small, white, crowded in dense cymes.
Sierra Leone : Konno, Kayime (July–Aug.) ! Ivory Coast : Mankono, between Dialakoro and Kénégoué (July) ! Baoulé-Nord, Bouaké (July) ! Gold Coast : West. Prov. Ashanti, Techeri (June) ! S. Nigeria : Oyo, Ogbomosho, Awta, etc., fairly common ! Exsicc.—*Millson* 104. *Millen* 12 ; 153 ; 157. *Rowland*. *Dawe* 525. *Chipp* 475. *Miles*. (See Appendix).

12. **C. Barteri** *Baker*—F.T.A. 5 : 298. A forest scrambling undershrub or erect shrub, rusty-pubescent, with small white flowers ¼–⅓ in. long in terminal, pedunculate, branched cymes.
S. Nigeria : Brass ! Oban ! Cameroons Mt. : Tiko (Feb.) ! Bulijambo (Mar.) ! Also in Cameroons, Duala, etc. Exsicc.—*Barter* 51. *Talb.* 1491. *Maitland* 557 ; 980.

13. **C. scandens** *Beauv.* Fl. Owar. 2 : 6, t. 62 ; F.T.A. 5 : 304 ; Stapf 643 ; Holl. 3 : 524 ; Chev. Bot. 508. A scrambling and climbing undershrub with finely pubescent branchlets, and flowers 1 in. long, white with pink centre in cymes forming panicles, the sepals becoming coloured in fruit.
French Guinea to S. Nigeria and Fernando Po ! Exsicc.—*Heudelot* 519. *Don.* *T. Vogel* 53 ; 98. *Ansell*. *Miss Turner*. *Barter* 2058. *Mann* 83. *Sc. Elliot* 3881 ; 4148. *Cummins* 125. *Brown* 394. *Johnson* 284. *Farmar* 177. *Whyte*. *Linder* 1382. (See Appendix).

14. **C. splendens** *G. Don.*—F.T.A. 5 : 300 ; Stapf 643 ; Holl. 3 : 524 ; Chev. Bot. 509. Habit of the last, glabrous, with corymbs of deep red flowers 1–1½ in. long.

Senegal to N. Nigeria (Bassa district) and S. Nigeria ! Extends to Angola. Exsicc.—*Don. Oldfield. Barter* (no numbers). *Mann* 732. *Moloney. Millen* 9. *Rowland. Whyte. Farmar* 149. *Lamb* 24. (See Appendix).

15. **C. Buchholzii** *Gürke*—F.T.A. 5 : 301 ; Holl. 3 : 523. *C. Preussii* Gürke. *C. Schifferi* A. Chev. Bot. 509, name only. A glabrous lofty-climbing shrub, with white fragrant flowers in cymes forming long panicles often arising from the old wood even near the base of the stem ; petioles jointed, leaving stout spines.

French Guinea : Kouria (Sept.–Oct.) ! Sierra Leone : Bumba (Sept.) ! N. Prov., Makump (Aug.) ! Liberia : Du River (Aug.) ! Gbanga (Sept.) ! Ivory Coast : Bingerville ! Middle Cavally, Kéeta (July) ! Gold Coast : Aburi Hills (July, Oct.) ! Akwapim Hills (Aug.) ! S. Nigeria : Lagos Colony ! Afikpo ! Oban ! Cross R. (Dec.) ! Cameroons Mt. : Likomba Plantation (Oct.) ! Barombi to Kumba ; Elephant Lake. Extends to Gabon and Angola. Exsicc.—*Holl.* 233. *Johnson* 169 ; 462 ; 771. *Punch. Williams* 40. *N. W. Thomas* 1921. *Deighton* 1370. *Linder* 252 ; 730. *Mildbr.* 10507. *Chev.* 14899 ; 15049 ; 16009 ; 16010 ; 19320 ; 20150.

16. **C. bipindense** *Gürke*—F.T.A. 5 : 516. A climbing shrub with glabrous branchlets, with very lax cymes of cream- or yellowish-white flowers, cauliflorous, often near the base of the stem.

S. Nigeria : Oban ! Cameroons Mt. : Victoria (Nov.) ! Likomba Plantation (Nov.) ! Fernando Po (Dec.) ! Also in French Cameroons. Exsicc.—*Mann* 71. *Maitland* 783. *Mildbraed* 10706.

17. **C. eupatorioides** *Baker*—F.T.A. 5 : 295. Erect herb 4–6 ft. high, with slender glandular-pilose stems, and white flowers 1¾ in. long in dense terminal clusters.

Cameroons Mt., forest, 2,000 ft. (Dec.) ! Exsicc.—*Mann* 1295.

18. **C. Bakeri** *Gürke*—F.T.A. 5 : 296 ; Chev. Bot. 507. A shrub 4 ft. high or scandent, with fragrant pure white flowers 1½ in. long in dense peduncled heads often from the lower part of the stem.

Sierra Leone : Mussaiya (Mar.) ! Falaba (Mar.) ! Panguma (Mar.) ! Ivory Coast : swamp forest between Middle Sassandra and Middle Cavally (June-July) ! Exsicc.—*Sc. Elliot* 5201 ; 5309. *Lane-Poole* 68.

19. **C. Welwitschii** *Gürke*—F.T.A. 5 : 308. A climbing shrub with brown-glandular-pubescent branchlets, broad cordate leaves and white flowers 1½ in. long glandular on the outside.

S. Nigeria : Eket ! Also in Angola. Exsicc.—*Talb.* 3033.

20. **C. acerbianum** *Boiss.*—F.T.A. 5 : 295. Erect or scrambling shrub with rather small leaves 1–2 in. long and white flowers, pubescent outside, 1 in. long, in dense terminal and axillary pedunculate clusters.

Gambia ! Also in Upper Nile Land. Exsicc.—*Pirie* 46.

21. **C. sinuatum** *Hook.* Bot. Mag. t. 4255—F.T.A. 5 : 295 ; Holl. 3 : 524 ; Chev. Bot. 509. Erect shrub 6 ft. high, or scandent, densely rusty-hairy, with white flowers ¾–1 in. long in dense globose terminal hairy clusters.

French Guinea : Futa-Jallon, Timbo and environs (Mar.). Sierra Leone : ? localities ! Gold Coast : E. Prov., Dawa (May) ! S. Nigeria : Abeokuta ! Lagos Colony ! Exsicc.—*Whitfield. Harrison* 2. *Millen* 151. *Foster* 102. *Howes* 908.

22. **C. capitatum** *Schum. & Thonn.* ; Bot. Mag. t. 4355—F.T.A. 5 : 305 ; Holl. 3 : 523 ; Chev. Bot. 507. *C. Talbotii* Wernham. *C. obanense* Wernham. Erect shrub, occasionally scandent, sometimes almost a tree, densely glandular-hairy, with stout blunt spines from the remaining petiole-bases, and terminal sessile heads of tubular white flowers 3–4 in. long, sometimes on the older wood.

Senegal and French Sudan to N. and S. Nigeria ! Cameroons Mt., 3,000 ft. ! Extends to Upper Nile Land and E. Africa. Exsicc.—*Thierry. T. Vogel* (no number). *Barter* 342. *Irving* 111. *Mann* 1957. *Whitfield. Ingram. Millen* 45. *Elliott* 90. *Talb.* 341 ; 2081. (See Appendix).

## 7. **VITEX** Linn.—F.T.A. 5 : 315 ; Pieper in Engl. Bot. Jahrb. 62 : Beibl. 142 : 1–91 (1928).

Leaves tomentose or densely pubescent below :

Leaves trifoliolate or unifoliolate, rounded at the apex or slightly mucronate :

Leaves often unifoliolate and then broadly ovate-orbicular, up to 12 cm. long and 11 cm. broad, with about 8 pairs of lateral nerves, when three leaflets then obovate, softly tomentose below ; petiole woolly-pubescent ; cymes pedunculate, dichotomous ; bracts linear ; calyx 5 mm. long ; corolla tomentose ; fruit obovoid, 1·5 cm. long .. .. .. .. .. .. .. .. 1. *diversifolia*

Leaves never unifoliolate, sometimes with one or two extra leaflets, leaflets rather narrowly obovate, up to 10 cm. long and 5 cm. broad, entire or crenate-serrate in the upper half, glabrous or slightly pubescent above, thinly tomentellous below ; petiole at first tomentose, becoming nearly glabrous ; cymes few-flowered, small ; calyx 4 mm. long ; corolla thinly pubescent ; fruit broadly ellipsoid, 2 cm. long, tomentose .. .. .. .. .. .. .. .. 2. *chrysocarpa*

Leaves 5–7-foliolate, acutely acuminate :

Petioles densely shaggy-villous, up to 16 cm. long ; leaflets sessile obovate, very acutely acuminate, 10–15 cm. long, 4–8 cm. broad, scabrid-setulose above, the midrib shaggy, thinly and softly tomentellous below ; cymes long-pedunculate, laxly divaricate ; bracts linear, 4 mm. long ; calyx 2·5 mm. long .. 3. *rufa*

Petioles very shortly tomentellous, slender ; leaflets stalked, oblong-elliptic, cuspidate-acuminate, 4–9 cm. long, 3–5 cm. broad, entire or serrate in the upper half, densely glandular and pubescent below ; cymes very small and shortly stalked ; calyx tomentose, lobes triangular.. .. .. .. .. .. 4. *Fosteri*

Leaves glabrous or thinly pubescent or minutely tomentellous below :

Leaflets rounded or with a very short cusp at the apex :

Leaves 5–7-foliolate ; leaflets obovate, cuneate at the base :

Leaflets stalked, variable in size, slightly apiculate or emarginate, up to 15 cm. long and 7 cm. broad, with about 10 pairs of parallel lateral nerves ; cymes mostly short and stout, densely flowered ; calyx hirsute, toothed, 5 mm. long ; corolla 1 cm. long, very villous outside ; fruit oblong-ellipsoid, 2 cm. long, glabrous 5. *Cienkowskii*

Leaflets sessile, obtuse or cuspidate, the end one 8–10 cm. long, 4–5 cm. broad ;

petiole densely rusty-pubescent; cymes as above, densely pubescent; corolla small, pubescent outside; fruit globose, 1 cm. or less in diam. 6. *ferruginea*

Leaves 3-foliolate; sometimes with one or two smaller leaflets in addition:

Leaflets 5–12 cm. long, crenulate in the upper half; cymes small, minutely tomentellous all over .. .. .. .. .. .. .. .. 7. *barbata*

Leaflets 2–12 cm. long, entire or with a few large teeth; cymes rather long-pedunculate, softly villous all over .. .. .. .. .. 8. *camporum*

Leaflets very distinctly acuminate:

Inflorescence an elongated pyramidal panicle up to 35 cm. long, with long slender lateral branches; bracts linear, about 4 mm. long; flowers small and crowded; calyx subtruncate, 3·5 mm. long, minutely puberulous; leaflets obovate-elliptic, cuspidate-acuminate, unequal-sided at the base, about 15 cm. long and 9 cm. broad, finely reticulate below, with about 5 pairs of lateral nerves, gland-dotted below.. .. .. .. .. .. .. .. .. 9. *thyrsiflora*

Inflorescence corymbose-cymose or divaricately branched:

Leaflets entire:

Leaflets very much narrowed to the base, obovate, acutely acuminate, 12–30 cm. long, up to 10 cm. broad, with about 12 pairs of lateral nerves, glabrous below; cymes dichotomous, short, minutely tomentellous; calyx 5 mm. long, denticulate 10. *grandifolia*

Leaflets very shortly narrowed at the base, 4-elliptic-lanceolate, gradually acuminate, 7–15 cm. long, 2–5 cm. broad, with about 12 pairs of parallel lateral nerves pubescent below; cymes very slender and repeatedly dichotomously branched; flowers very small and numerous .. .. .. 11. *rivularis*

Leaflets toothed:

Calyx nearly glabrous; leaflets rather large, mostly over 10 cm. long, coarsely serrate .. .. .. .. .. .. .. .. 12. *oxycuspis*

Calyx very distinctly and shortly pubescent; leaflets small, rarely up to 10 cm. long, crenate .. .. .. .. .. .. .. 13. *micranthu*

1. **Vitex diversifolia** *Baker*—F.T.A. 5 : 323; Holl. 3 : 526; Chev. Bot. 506. *V. Vogelii* Baker. A small tree, densely pale-pubescent, with small hairy flowers ¼ in. long, greenish with blue-purple corolla-lobes, in peduncled axillary cymes, and violet-black plum-like fruit.
French Sudan: Sansanding. Gold Coast: N. Terr., Bujan to Sekaii (Apr.)! N. Nigeria: common in savannah (Jan.–May)! S. Nigeria: Yoruba country! Exsicc.—*Barter* 1096; 1644. *E. Vogel* 97. *Dalz.* 176. *Lely* P. 197; 849. *Dent Young* 206. *Kitson* 689. (See Appendix).

2. **V. chrysocarpa** *Planch.*—F.T.A. 5 : 325; Chev. Bot. 506. A small or a fair-sized tree of stream fringes, densely yellow-pubescent on the young parts, with blue or blue-purple hairy flowers ⅓–½ in. long in axillary pedunculate cymes; fruits velvety at first becoming black and smooth.
French Sudan: several localities! French Guinea: Farana, by the Niger! Liberia: Dukwia R. (fr. Mar.)! Gold Coast: Makongo! Yeji (Apr.)! N. Terr., Tamale, Yamalaga, Walwale district, etc. (Apr.)! Togo: Yendi (Apr.)! N. Nigeria: Lokoja and vicinity! Nupe! Abinsi (Mar.)! Yola, on rocky hills (May)! Exsicc.—*T. Vogel* 142. *Barter* 388; 1214; 1651. *Sc. Elliot* 5383. *Anderson* 25. *Dalz.* 2; 115; 771. *Vigne* 1688. *Kitson* 687; 688; 729. *Lloyd-Williams* 150. *G. P. Cooper* 67. (See Appendix).

3. **V. rufa** *A. Chev.* Bot. 507, name only. A medium-sized tree, densely rusty-hairy on branchlets, petioles and inflorescence, with small flowers in lax spreading cymes, one corolla-lobe purple, 4 white.
Liberia: Dukwia R.! Ivory Coast: Cavally Basin, Tépo country, Grabo! Exsicc.—*Chev.* 19712. *G. P. Cooper* 355. (See Appendix).

4. **V. Fosteri** *C. H. Wright* in Kew Bull. 1908 : 437; Holl. 3 : 526. A tree, up to 50 ft. high, the young parts dull yellow-villous, with 5–7-foliolate leaves, and flowers ⅙ in. long white-lilac or pinkish turning yellow.
Gold Coast: Tsifufu, Ashanti (Mar.)! Odumasi (Mar.)! N. Terr., Bugiyenga to Loggoda! S. Nigeria: Lagos, Ikoyi (Apr.)! Creek Town, E. Province (Mar.)! Exsicc.—*Foster* 34. *Thomson* 37. *Unwin* 9. *Dalz.* 1246. *Deighton* 604. *Kitson* 691. (See Appendix).

5. **V. Cienkowskii** *Kotschy & Peyr.* Pl. Tinn. 27, t. 12—F.T.A. 5 : 328; Holl. 3 : 525. *V. Doniana Sweet. V. divaricata* Baker. *V. cuneata* Schum. & Thonn.—Chev. Bot. 506, partly. A tree 30–50 ft. high, with glabrous leaves and branchlets, and hairy flowers ⅓ in. long yellowish or white with blue-purple corolla-lobes.
In savannah forest and open country, from Senegal to N. Nigeria and Lagos Colony! Also in Fernando Po! Extends to E. Sudan, Upper Nile Land, and E. Africa; also Congo Basin and Angola. Exsicc.—*Heudelot* 379. *E. Vogel* 67. *Barter* 1108. *Milne. Sc. Elliot* 5211. *Rowland. Millen* 118. *Chipp* 463; 727; 744. *Yates* 59. *Dalz.* 350. *Lely* P. 134. *Pobéguin* 682. *Chev.* 2769. *Warnecke* 156. (See Appendix).

6. **V. ferruginea** *Schum. & Thonn.*—F.T.A. 5 : 324. A tree 20–25 ft. or more high, softly rusty-pubescent.
Gold Coast: ? locality hills. Also in Angola. Exsicc.—*Thonning* (not seen).

7. **V. barbata** *Planch.*—F.T.A. 5 : 323. A tree, finely pubescent on the young parts, leaves with 3 leaflets with sometimes 1 or 2 smaller ones in addition; flowers hairy, yellowish and blue-purple in long peduncled cymes.
French Sudan: Medinani (Feb.)! Senegal! Gambia: near Sukuko (Jan.)! French Guinea: Banancoro: Ditinn! Konkouré to Timbo! Sierra Leone: Talla Hills, Mt. Gonkwi (Feb.)! Falaba (Mar.)! Gold Coast! N. Terr., Murumbele to Bantala (Apr.)! Exsicc.—*Heudelot* 30. *Ingram. Sc. Elliot* 4881; 5189. *Dalz.* 8061. *Kitson* 835. *Chev.* 496; 510 bis; 511; 12460; 12467; 12990.

8. **V. camporum** *Buettn.*—F.T.A. 5 : 323; Chev. Bot. 505. A shrub or small tree, pubescent on the branchlets and inflorescence, with very small hairy whitish flowers.
French Sudan: Samory country, Medinani (Feb.)! French Guinea: between the Konkouré and Timbo (Mar.)! Banancoro, in the bush (Feb.)! Ditinn (Apr.)! Also in Congo and Angola. Exsicc.—*Chev.* 12467.

9. **V. thyrsiflora** *Baker*—F.T.A. 5 : 319. *V. agraria* A. Chev. Bot. 505, name only. *V. obanensis* Wernham. A tree with glabrous branchlets and 5-foliolate leaves, the leaflets rather long-stalked, with small whitish flowers and small obscurely 4-lobed fruits ⅙ in. in diameter.
French Guinea: Farana (Apr.)! Between the Kaba and Upper Mamou (May)! Ivory Coast. Agniéby Valley, Attéou, in forest (Jan.)! Middle Cavally, Kéeta (July)! Tépo country, Taté village (Aug.)! S. Nigeria: Oloke Meji! Abeokuta! Lagos Colony, ? locality! Oban! Exsicc.—*Harrison* 5. *Rowland. Talb.* 1044. *Chev.* 13199; 13267; 14122; 17055; 17140; 19340; 19805.

10. **V. grandifolia** *Gürke*—F.T.A. 5 : 324; Stapf 643; Holl. 3 : 526. *V. cuneata* A. Chev. Bot. 506, partly, not of Schum. & Thonn. *V. lutea* A. Chev. Bot. 506. *V. bipindensis* Gürke. A small tree with glabrous branchlets and subcoriaceous 5-foliolate leaves; flowers ½ in. long silky outside, yellowish with brown-purple tips; habitat secondary forest.

Casamance and French Guinea to S. Nigeria and Cameroons ! Extending to Gabon. Exsicc.—*Barter* 354; 2098; 2180. *Mann* 880. *Rumsey* 14. *Sc. Elliot* 4327. *Rowland. Millen* 32; 64. *Whyte Unwin* 47. *Farquhar* 12. *Murphy* 676. *Vigne* 1041. *Dalz.* 1247. *Talb.* 2057. *Chev.* 14799; 15470; 16508; 17107; 17275; 19091; 19790; 19819. *Winkler* 1165. (See Appendix).

11. **V. rivularis** *Gürke* in Engl. Bot. Jahrb. 33 : 297. *V. ciliofoliolata* A. Chev. Bot. 506, name only. A tree 30–40 ft. high, with long-petioled 5–7-foliolate leaves and a much branched inflorescence of small whitish lilac-tipped flowers pubescent on the outside; fruits black ellipsoid or obovoid, ½in. long.

Ivory Coast: Middle Sassandra, Guidéko (fr. June) ! Gold Coast: Adeambra (May) ! Dunkwa (fr. June) ! Agogo (Apr.) ! Cameroons Mt., Likomba Plantation (fr. Oct.) ! Also in French Cameroons. Exsicc. —*Vigne* 865; 895; 1094. *Irvine* 951. *Mildbraed* 10535. *Chev.* 19097. (See Appendix).

12. **V. oxycuspis** *Baker*—F.T.A. 5 : 326. A tree 15–25 ft. high with glabrous branchlets, and small flowers in lax long-peduncled cymes.

Sierra Leone: ? locality ! Liberia: Dukwia R. ! Ivory Coast: Attié, Alépé ! Gold Coast: Ankobra Junction ! S. Nigeria: Oban ! Calabar R. (Feb.) ! Exsicc.—*Mann* 2243. *Unwin* and *Smythe* 37. *Kitson* 1001. *G. P. Cooper* 321. *Chev.* 17371. (See Appendix).

13. **V. micrantha** *Gürke*—F.T.A. 5 : 324; Chev. Bot. 507. *V. longeacuminata* A. Chev. Bot. 506, name only. A fairly large forest tree with shortly pubescent branchlets, 5-foliolate leaves, and small white lilac-tipped flowers silky outside, comparatively few in long-pedunculate cymes.

Sierra Leone: Heddle's Farm (May) ! Bagroo R. (Apr.) ! Falaba (Apr.) ! Njala (May) ! Victoria (Mar.) ! Liberia: Dukwia R. (fr. Apr.) ! Ivory Coast: Attié, Alépé (Feb.) ! Bingerville, Abidjean, Dabou ! Ahiamé in the Sanvi (Mar.) ! Gold Coast: Assin Yan Kumasi ! Exsicc.—*Mann* 860. *Cummins* 74. *Lane-Poole* 243. *Aylmer* 46. *N. W. Thomas* 9064. *Deighton* 658. *G. P. Cooper* 70. (See Appendix).

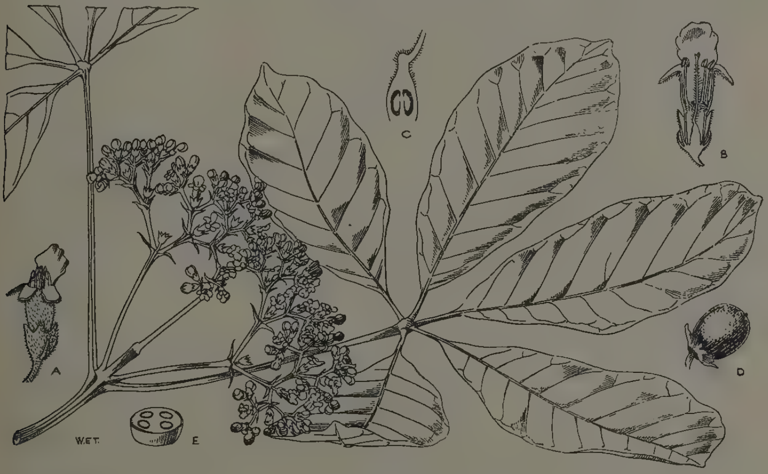

FIG. 273.—VITEX CEINKOWSKII *Kotschy & Peyr.* (VERBENACEAE).

A, flower. B, longitudinal section of flower. C, same of ovary. D, fruit. E, cross-section of ovary.

## 8. STACHYTARPHETA Vahl—F.T.A. 5 : 283.

Leaves ovate or ovate-lanceolate or subobovate, coarsely serrate, rather abruptly cuneate at the base into the rather long petiole, up to 10 cm. long and 5 cm. broad, glabrous or nearly so; spikes slender, up to 30 cm. long; bracts oblong or lanceolate, acutely acuminate, closely appressed, about 8 mm. long, glabrous .. 1. *jamaicensis*

Leaves narrowly oblanceolate, coarsely serrate, gradually narrowed to the base into the short petiole; stems sometimes fasciated; spikes, etc., as above 2. *angustifolia*

1. **S. jamaicensis** *Vahl* Enum. 1 : 206. *Verbena jamaicensis* Linn. *V. indica* Linn. *S. indica* Vahl—F.T.A. 5 : 284; Stapf 642; Holl. 3 : 518; Chev. Bot. 503. Herb 2–3 ft. high, branched, nearly glabrous, sometimes half-succulent, with blue flowers (sometimes white) placed in hollows on the long narrow rhachis, the limb 5-lobed, ¼ in. across.

A common wayside weed ! Also in tropical Asia and America. Exsicc.—*T. Vogel* 30. *Mann* 89. *Sc. Elliot* 3833; 4162. *Dawodu* 224; 364. *Johnston. Dennett* 502. (See Appendix).

2. **S. angustifolia** *Vahl*—F.T.A. 5 : 284; Chev. Bot. 503. Habit of the last but usually more slender in branches and inflorescence, the flowers pale blue or lilac with a very small limb.

French Sudan: Kabara (Aug.) ! Senegal. Gambia ! French Guinea: Kouroussa (June) ! Sierra Leone: Port Lokko (Dec.) ! Kaballa (Sept.) ! Ivory Coast: Comoe R., between Alépé and Malamalasso (Mar.). Gold Coast: Salaga ! Togo: Sokode-Basari, in savannah ! Lome ! N. Nigeria: Jebba ! Ilorin, Aguji ! Bauchi Plateau, Lemme, 2,600 ft. (Apr.) ! Naraguta ! S. Nigeria: Rio del Rey ! Tropical Africa and America. Exsicc.—*Barter* 1200. *Thornton. Lely* P. 71; 142. *N. W. Thomas* 2181; 6596. *Hayes* 549. *Pobéguin* 298. *Krause. Schroeder* 121. *Warnecke* 259.

## 145. LABIATAE

Herbaceous or rarely woody, often odoriferous. Stems usually quadrangular. Leaves opposite or whorled, simple; stipules absent. Flowers hermaphrodite, zygomorphic, rarely almost actinomorphic, axillary, whorled or paniculate. Calyx persistent, of 5 variously united sepals, often 2-lipped. Corolla gamopetalous, hypogynous, tubular; lobes 4–5, imbricate, often forming 2 lips or rarely 1 lip. Stamens on the corolla-tube, 4 or 2; anthers 2-celled, cells often divergent, opening lengthwise. Ovary superior, of 2 deeply lobed carpels, the style (gynobasic) rising from the inner base of the lobes; stigma mostly bifid. Ovules 4 in each ovary, erect. Fruit of 4 achene-like nutlets, free or cohering in pairs. Seeds with usually straight embryo without endosperm, or the latter very scanty.

A large cosmopolitan family of herbs or undershrubs, recognised by the usually 4-angled stems, opposite (very rarely alternate) leaves, commonly glandular and odoriferous, deeply lobed ovary with gynobasic style, and by the fruit of 4 nutlets.

*Fertile stamens 4:

†Stamens with the filaments entirely free from one another:

‡Anthers (at least of the upper pair) 2-celled:

Calyx not 2-lipped, and not or only slightly accrescent:

Calyx 5-toothed:

Lower pair of stamens longer than the upper:

Upper lip of the corolla rather small, erect, flat; calyx 12–15-ribbed; flowers in small axillary cymes; a perennial herb with small ovate leaves 1. **Micromeria**

Upper lip of the corolla large and concave; calyx 10-ribbed:

Nutlets scaly at the apex; erect herbs or undershrubs with flowers in dense spike-like racemes 2. **Achyrospermum**

Nutlets naked at the apex; weak, straggling herb with prickly stems (in the only West African species), and flowers in distant whorls forming a terminal raceme-like panicle 3. **Stachys**

Lower pair of stamens shorter than the upper; calyx 13–15-ribbed; upper lip of the corolla large, concave; whorls of flowers distant below, crowded into a spike above; stout erect perennials 4. **Nepeta**

Calyx 8–10-toothed:

Upper lip of corolla as long as the lower; middle lobe of lower lip larger than the lateral ones; corolla small, white 5. **Leucas**

Upper lip of corolla much longer than the lower; middle lobe of lower lip scarcely longer than the lateral ones; corolla large, about 2·5 cm. long, yellow or orange-red 6. **Leonotis**

Calyx 2-lipped:

Calyx-tube cylindrical, 5-toothed, upper lip 3-fid, lower lip 2-fid, not accrescent; corolla-tube exserted, upper lip flat, lower lip 2-fid; nutlets smooth 7. **Calamintha**

Calyx-tube campanulate, with two entire lips, accrescent:

Calyx lips closed after flowering; corolla-tube much exserted from the calyx, upper lip concave; nutlets tubercled or hispid 8. **Scutellaria**

Calyx becoming bladder-like, and splitting to the base into 2 lips after flowering; corolla-tube scarcely longer than the calyx, upper lip short orbicular, lower lip 3-fid; nutlets with a broad membranous wing 9. **Tinnea**

‡‡Anthers 1-celled, or becoming 1-celled on dehiscence:

Leaves alternate; calyx circumscissile in fruit 10. **Icomum**

Leaves opposite:

Calyx circumscissile in fruit, truncate or minutely bilabiate; flowers unilaterally arranged; corolla-tube much longer than the calyx, subcylindrical, bilabiate, upper lip short, 4-fid, the lower lip longer, oblong-obovate, not deeply concave 11. **Aeolanthus**

Calyx not circumscissile in fruit:

Lower lip of corolla abruptly deflexed, concave, narrowed to the base; calyx subequally 5-toothed 12. **Hyptis**

Lower lip of corolla not abruptly deflexed:

Calyx 5-toothed (sometimes unequally so):

Calyx with many close ribs and sharp teeth 13. **Lavandula**

Calyx not closely ribbed:

Upper lobe of calyx decurrent on the tube:

Style bifid, each stigma linear 14. **Ocimum**

Style entire, stigma capitate 15. **Orthosiphon**

Upper lobe of calyx not decurrent on the tube:

Corolla-tube not or only slightly longer than the calyx:

Flowers in dense cylindrical or spike-like racemes; corolla 6–8 mm. long, lips subequal, lower entire 16. **Geniosporum**

Flowers in more or less separated whorls, paniculate ; corolla very small, 2·5 mm. long ; calyx not accrescent .. .. .. 17. **Moschosma**

Corolla-tube distinctly longer than the calyx :

Flowers in bracteate heads ; corolla small, upper lip shortly 4-lobed, lower lip entire, nearly flat, scarcely longer than the upper ; calyx scarcely accrescent .. .. .. .. .. .. .. 18. **Acrocephalus**

Flowers in dense cylindrical spikes ; corolla-tube bent, upper lip shortly 4-lobed, the lower entire, longer, deeply concave ; calyx slightly accrescent, the teeth rigidly bristly .. .. .. .. 19. **Pycnostachys**

Flowers solitary, or in axillary cymes, forming a raceme or panicle ; corolla-tube bent, gibbous at the base, upper lip shortly 3–4-lobed, the lower lip large and concave ; calyx slightly accrescent, gibbous at the base 20. **Plectranthus**

Calyx with two broad lips, the upper minutely toothed, the lower entire ; corolla very small, scarcely longer than the calyx .. .. .. 21. **Platystoma**

††Stamens with the filaments more or less united :

Calyx with two oblong entire lips .. .. .. .. .. 22. **Solenostemon**

Calyx 5-toothed, sometimes unequally so :

Calyx subactinomorphic, not bilabiate :

Four lower teeth of calyx deltoid-subulate, shorter than the upper lanceolate tooth ; inflorescence a long dense raceme of crowded whorls, erect herbs 23. **Leocus**

Four lower teeth of calyx equal to the upper tooth ; inflorescence lax, composed of slender branched racemes ; weak straggling or suberect herbs 24. **Englerastrum**

Calyx distinctly bilabiate ; corolla-tube bent at the middle ; lower lip large and concave :

Upper calyx-tooth ovate, the 4 lower teeth longer, subequal, narrow, long-mucronate in fruit .. .. .. .. .. .. .. .. .. 25. **Coleus**

Upper calyx-tooth ovate, mucronate, the 2 lower teeth longer than the two lateral ones, subulate, or all teeth subequal and then deltoid .. 20. **Plectranthus**

Upper calyx-tooth oblong, concave, deflexed, the 4 lower teeth subequal, very short, subacute ; filaments united only at the base .. 26. **Anisochilus**

**Fertile stamens 2 :

Stamens with free filaments ; fruiting calyx not berry-like ; upper lip of the corolla concave, lower lip 2–3 lobed .. .. .. .. .. .. 27. **Salvia**

Stamens with shortly united filaments ; fruiting calyx berry-like ; anther-cells confluent ; lower lip of the corolla concave, upper lip small .. 28. **Hoslundia**

### 1. **MICROMERIA** Benth.—F.T.A. 5 : 452.

Small herb from a woody base ; stems pubescent with long and shorter recurved hairs ; leaves ovate, rounded at the base, the largest about 1 cm. long, with several ascending nerves, scabrid above, spotted with large glands below ; flowers few in whorls ; pedicels very short ; calyx tubular, 4 mm. long, strongly 12–15-ribbed, minutely setulose ; lobes subequal, subulate ; corolla slightly exserted ; stamens 4 ; anthers 2-celled .. .. .. .. .. .. .. .. .. .. *biflora*

**M. biflora** *Benth.*—F.T.A. 5 : 452. Erect or spreading ½–1 ft. long, heath-like plant with small purple flowers. Cameroons Mt., grasslands, 7,000–10,000 ft. (Dec.–Mar.) ! Tropical and S. Africa and in India. Exsicc.—*Mann* 1292 ; 1981. *Johnston* 39. *Kalbreyer* 115. *Dunlap* 210 ; 241. *Dalz.* 8309.

### 2. **ACHYROSPERMUM** Blume—F.T.A. 5 : 463 ; Perkins in Notizbl. Bot. Gart. Berl. 8 : 78 (1921).

Leaves very abruptly and broadly cuneate at the base, the blade broadly ovate, acutely acuminate, crenate-serrate, about 15 cm. long and 7 cm. broad, setose-pilose on both surfaces, with about 7 pairs of lateral nerves ; petiole 4–5 cm. long, long-pilose ; spikes terminal, sessile, 8–12 cm. long, 2 cm. diam. ; bracts broadly ovate, about 8 mm. long ; calyx about 10-nerved, tube 6 mm. long, shortly pubescent, lobes equal, narrowly triangular, ciliate .. .. .. .. .. .. 1. *africanum*

Leaves gradually narrowed to the base, narrowly obovate-elliptic, triangular-subacute, 10–18 cm. long, up to 8 cm. broad, closely puberulous on the nerves below, minutely glandular-punctate, obscurely crenate in the upper part ; lateral nerves about 7 pairs ; spikes terminal, sessile, 4–6 cm. long, 2 cm. diam. ; bracts broadly ovate, ciliate ; calyx as above .. .. .. .. .. .. 2. *oblongifolium*

1. **A. africanum** *Hook. f.*—F.T.A. 5 : 465. *A. Schimperi* Perkins l.c. 79, partly. *Ocimum Peulhorum* A. Chev. Bot. 512. Erect herb 3–6 ft. high, with fairly stout pithy hairy stems, and purple flowers ¼–⅓ in. long in dense spikes.
   Cameroons Mt., forest, up to 3,000 ft. (Dec.–Mar.) ! Also in French Cameroons. Exsicc.—*Mann* 1297 ; 1949. *Kalbreyer* 99. *Dunlap* 151. *Chev.* 15114 ; 20261 ; 20347.
2. **A. oblongifolium** *Baker*—F.T.A. 5 : 464. *Ocimum Sassandrae* A. Chev. Bot. 512. Herbaceous undershrub erect, densely short-pubescent, woody below, with terminal dense oblong spikes 1–2½ in. long of yellowish-white flowers.

French Guinea: Konianké country, between Fassakoidou and Kesseridou (Feb.)! Guerzé country, Mt. Boola, on Mt. Ntongon, 3,150 ft. (Mar.)! Sierra Leone: Kennema (Jan.)! Mamaha (Nov.)! Ivory Coast: Middle Sassandra and Middle Cavally, in forest clearings (June–July)! Fernando Po (June)! Exsicc.—*Barter* 1697. *N. W. Thomas* 4578; 7572; 7629. *Chev.* 19244; 20814; 20926.

### 3. **STACHYS** Linn.—F.T.A. 5 : 465.

Stems weak and straggly, armed with numerous recurved prickles: leaves long-petiolate, ovate-triangular, widely rounded-cordate at the base, 2–2·5 cm. long, 1·5–2 cm. broad, crenate, pilose above, thinly so on the nerves below; flowers 5–6 in each cluster; calyx 10-ribbed, 5 mm. long, equally 5-toothed, teeth triangular-subulate; corolla 1·5 cm. long, the lower lip much larger than the upper .. .. *aculeolata*

**S. aculeolata** *Hook. f.*—F.T.A. 5 : 466; Th. C. E. Fries in Notizbl. Bot. Gart. Berlin, 8 : 629, fig. 1, incl. var. *camerunensis* Th. Fries, l.c. fig. 2. Perennial with trailing slender stems and pink-white or purplish flowers ½–¾ in. long.

Cameroons Mt.: above Buea, etc., 3,000–over 7,000 ft. (fl. and fr. Jan.)! Bomana, 1,950 ft. (Dec.)! Fernando Po, 9,000 ft.! Above Basilé, 4,000–5,000 ft. (Aug.)! Also in N.W. Cameroons highlands. Exsicc.—*Mann* 319. *Johnston* 71. *Mildbraed* 6315.

*Note.*—Chevalier (Bot. 523) records a form of *S. arvensis* Linn. in cultivated ground in the Timbuktu region.

### 4. **NEPETA** Linn.—F.T.A. 5 : 459.

Branches woody; branchlets densely leafy, bristly pubescent; leaves ovate-rounded, on the main shoots about 3·5 cm. long, on the terminal shoots about 1·5 cm. long, rounded at the base, strongly nerved and bullate, setulose on the nerves below; spikes terminal, sessile, up to 5 cm. long; calyx-tube 4 mm. long, 13–15-ribbed, teeth subulate, short and subequal, ciliate; corolla shortly exserted; stamens 4, anther-cells 2, divergent .. .. .. .. .. .. .. .. *robusta*

**N. robusta** *Hook. f.*—F.T.A. 5 : 460. Erect branched robust perennial 3–4 ft. or more high, with rather small white or lilac-tinged flowers in spikes with, in their lower part, overlapping suborbicular strongly nerved leaves.

S. Nigeria: Calabar! Cameroons Mt., grasslands, 6,000–9,000 ft. or higher (Nov.–Feb.)! Exsicc.—*Mann* 1294; 1995. *Johnston* 53; 81. *Kalbreyer* 114. *Dunlap* 195. *Dalz.* 8333. *Deistel* 619. *Mildbraed* 10832. (See Appendix).

### 5. **LEUCAS** R.Br.—F.T.A. 5 : 472.

Longest bristle of the calyx on the adaxial (upper) side; calyx pubescent; leaves petiolate, ovate-lanceolate, with a broad blunt acumen, about 7 cm. long and 3 cm. broad, glandular and pubescent below, coarsely toothed; flower-clusters about 3 cm. diam. .. .. .. .. .. .. .. .. .. 1. *martinicensis*

Longest bristle of the calyx on the abaxial (lower) side:

Leaves petiolate, lanceolate, acute, up to 10 cm. long and 3 cm. broad, serrate, minutely glandular below and pubescent on the nerves; flower-clusters about 2·5 cm. diam. 2. *deflexa*

Leaves sessile, shortly lanceolate to linear, about 2 cm. long and 1 cm. broad, toothed in the upper half, densely glandular below and pilose on the nerves; flower-clusters 2–2·5 cm. diam. .. .. .. .. .. .. .. 3. *oligocephala*

1. **Leucas martinicensis** *R.Br.*—F.T.A. 5 : 479; Holl. 3 : 536; Chev. Bot. 524. Erect branched herb 2–3 ft. high, softly pubescent, odorous, with very small white flowers in dense axillary whorls, the calyx-teeth almost spinous.

French Sudan: San (Sept.); Ségou (Sept.). Senegal and Gambia! French Guinea: Futa-Jallon, between Soumbalako and Boulivel (Sept.)! N. Nigeria: Sokoto, common! Kontagora (Nov.)! Katagum! Bauchi Plateau, Naraguta (Feb., Aug.)! A weed of the tropics. Exsicc.—*Leprieur* ? 122. *Ingram*. *Brown-Lester* 40. *Farmar* 139. *Dalz.* 112; 135. *Moiser* 2. *Lely* 134; P. 166; 475. (See Appendix).

2. **L. deflexa** *Hook. f.*—F.T.A. 5 : 487. A tall herb with 4-angular shortly-pubescent pithy stems 4–8 ft. high, and small flowers ¼ in. long in globose whorls with hairy deflexed calyx.

Cameroons Mt., forest, 6,000–7,000 ft. (Nov., Jan., Feb.)! Exsicc.—*Mann* 1232; 1976. *Dunlap* 82.

3. **L. oligocephala** *Hook. f.*—F.T.A. 5 : 486. *L. bowalensis* A. Chev. Bot. 524. Perennial with slender hairy stems 1–4 ft. high from a woody base, and white flowers ⅓ in. long with strongly-nerved hairy calyx.

French Guinea: Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Oct.)! Dalaba to Sougouéta! N. Nigeria: Bauchi Plateau, Naraguta! Cameroons Mt., grasslands, 7,000–8,000 ft. (Nov., Jan.)! Also in E. Africa and Nyasaland. Exsicc.—*Mann* 1220; 1987. *Lely* 62. *Chev.* 18750; 20173.

### 6. **LEONOTIS** Pers.—F.T.A. 5 : 490.

Stems tomentellous; leaves long-petiolate, ovate-triangular, broadly cuneate at the base, the largest about 12 cm. long and 5–6 cm. broad, softly puberulous on both surfaces, coarsely serrate; flowers in a globose cluster at the nodes; bracts crowded at the base of the cluster, linear-subulate, very acute, about 1 cm. long; pedicels very short; calyx 1·5 cm. long, shortly pubescent, teeth subulate, equal, very acute; corolla pale yellow, villous .. .. .. .. .. .. .. 1. *africana*

Stems, leaves, etc., as above, but corolla orange-red .. .. 2. *nepetaefolia*

1. **L. africana** *Briq.* in Engl. and Prantl Naturl. Pflanzenf. 4, 3A : 246; Chev. Bot. 524. *L. pallida* Benth.—F.T.A. 5 : 491; Stapf 644. *Phlomis africana* P. Beauv. Fl. Owar. 2 : 82, t. 111. A tall robust herb 8–10 ft. high with 4-angled pale softly pubescent stems, and cream-yellow tomentose flowers 1 in. long in dense whorls with spine-tipped calyx-teeth and bracts; common near native dwellings and sometimes cultivated in gardens.

French Sudan: Kobalé. Senegal. Gold Coast: Accra (Sept.)! Krobo! Togo: Lome! Misahöhe! N. Nigeria: Borgu! Katagum (Sept.)! Bauchi Plateau, Naraguta and Jos (Sept.)! S. Nigeria: Lagos!

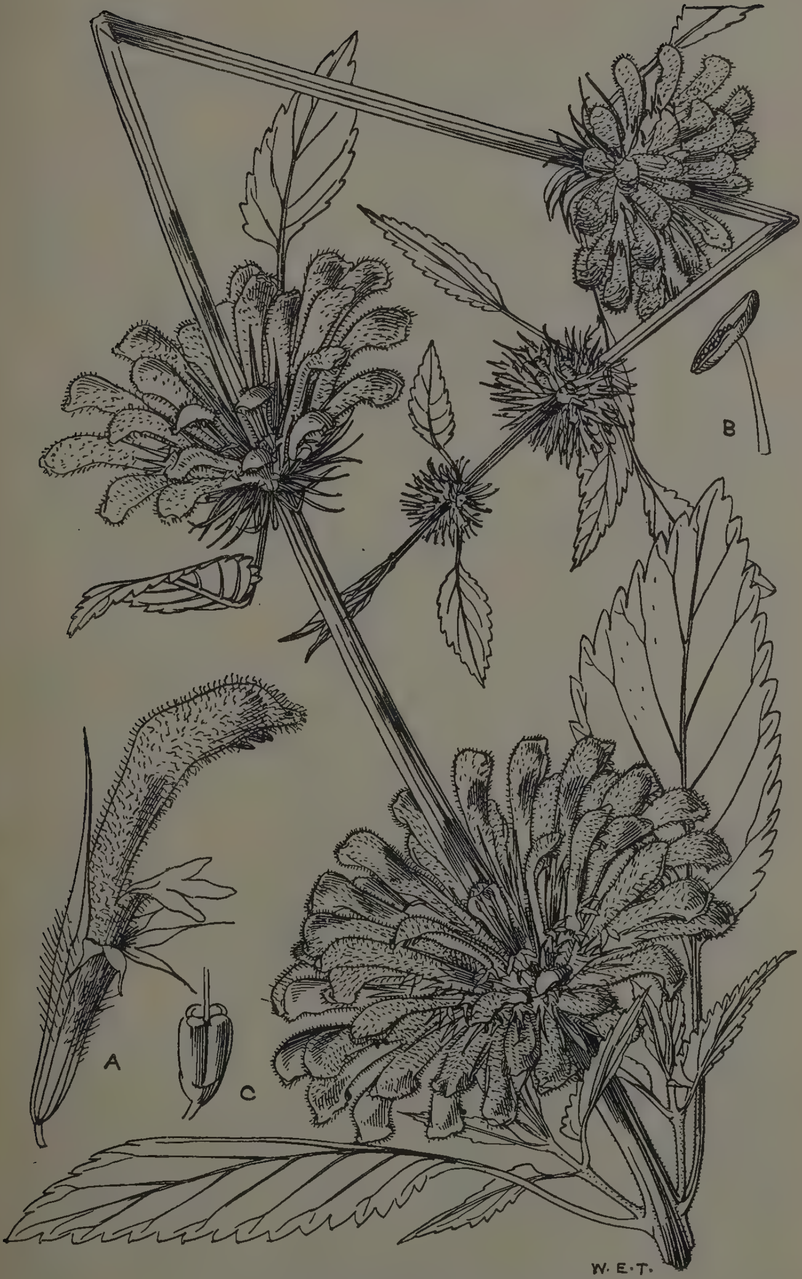

FIG. 274.—LEONOTIS AFRICANA *Briq.* (LABIATAE).
A, flower. B, stamen. C, ovary.

Lagos Colony ! Oban ! Extends to E. Africa and Nyasaland. Exsicc.—*T. Vogel* 36. *Barter* 1053. *Rowland. Dawodu* 84. *Foster* 333. *Dalz.* 110. *Lely* 588. *Talb.* 2064. *Baumann* 47. *Warnecke* 288. (See Appendix).

2. **L. nepetaefolia** *R.Br.*—F.T.A. 5 : 491 ; Stapf 644 ; Holl. 3 : 536 ; Chev. Bot. 524.
Sierra Leone : Regent, etc. (Dec.) ! Sherbro ! Pujehun (Feb.) ! Liberia : Kakatown ! Ivory Coast : between Tabou and Bériby. S. Nigeria : Lagos. General in the tropics. Exsicc.—*T. Vogel* 94. *Sc. Elliot* 4000. *Garrett* in *Herb. Sc. Elliot* 5765. *Whyte. N. W. Thomas* 8104.

### 7. CALAMINTHA Moench.—F.T.A. 5 : 454.

A small herb branched from the base ; stems softly pubescent and pilose ; leaves subsessile, broadly ovate, rounded at the base, 1–1·5 cm. long, about 1 cm. broad, setose on the nerves below ; flowers axillary, about 6 in a whorl ; pedicels up to 5 mm. long, pilose ; calyx broadly tubular, about 12-nerved, 5 mm. long in fruit, teeth subulate, subequal, pilose ; corolla nearly twice as long as the calyx ; stamens 4 ; anther-cells 2 .. .. .. .. .. .. .. .. .. *simensis*

**C. simensis** *Benth.*—F.T.A. 5 : 455. Perennial herb much-branched 1–2 ft. high, spreading, with pink-tinged or purplish flowers ⅓ in. long, the calyx often red-purple.
Cameroons Mt., grasslands up to 10,500 ft. (Dec., Jan.) ! Fernando Po, 8,500 ft. (Dec.) ! Also on the mountains of Abyssinia and E. Africa. Exsicc.—*Mann* 617 ; 1293 ; 1302 ; 2031. *Johnston* 21 ; 49.

### 8. SCUTELLARIA Linn.—F.T.A. 5 : 461.

A small herb from a woody rhizome ; stems shortly pubescent ; leaves ovate, subsessile, about 2 cm. long, puberulous on the nerves and slightly gland-dotted ; flowers forming leafy racemes ; pedicels short and pubescent ; calyx campanulate, broadly dentate, enlarging in fruit and becoming 2-lipped and then about 1 cm. long ; corolla 2 cm. long, not glandular .. .. .. .. .. .. .. *paucifolia*

**S. paucifolia** *Baker*—F.T.A. 5 : 462. *S. Briquetii* A. Chev. in Bull. Soc. Bot. Fr. Mém. 8d : 198 ; Chev. Bot. 523. Erect, stiff, 4-angled stems, mostly branched from the base, 6–12 in. high, with black-purple flowers, appearing after grass-burning.
French Guinea : Dabola (Mar.) ! Labé (Mar.) ! Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Mar.–Apr.) ! Timbo and Upper Niger (May) ! Soumbalako to Boulivel (Sept.) ! N. Nigeria : Bauchi Plateau (Apr.) ! Widely distributed in E. Africa. Exsicc.—*Lely* P. 245. *Pobéguin* 986. *Chev.* 12365 ; 12648 ; 13594 ; 18100 ; 18648.

### 9. TINNEA Kotschy & Peyr.—F.T.A. 5 : 496 ; Robyns in Bull. Jard. Bot. Brux. 8 : 161 (1930).

Leaves sessile or subsessile, ovate-orbicular to broadly obovate, entire, up to 2 cm. diam., mucronate, tomentose or pubescent below, densely glandular on both surfaces ; stems tomentose ; upper bracteate leaves markedly mucronate ; calyx with 2 entire orbicular lips about 7 mm. long, at length splitting to the base, tomentose outside ; corolla-tube pubescent, longer than the calyx ; calyx much enlarged and bladdery in fruit, about 1·5 cm. long .. .. .. ... .. .. .. 1. *Barteri*

Leaves petiolate, elliptic-lanceolate, entire, apiculate, about 3 cm. long and 1·5 cm. broad, glabrous except on the midrib, densely glandular-punctate ; stems tomentose ; calyx as above but thinly pubescent, enlarged in fruit .. .. 2. *aethiopica*

1. **T. Barteri** *Gürke*—F.T.A. 5 : 499 ; Chev. Bot. 524 ; Robyns l.c. 192. Undershrub 2–4 ft. high, with leaves often 3-nate, straight virgate stems and blue-purple flowers ⅓–½ in. long.
French Sudan : Gourma and Mossi, several localities. French Guinea : Kouroussa (Aug.) ! Gold Coast : Aburi ! Yeji (Aug.) ! N. Nigeria : Nupe ! Zungeru (Aug.) ! Kontagora (Sept.) ! Bauchi Plateau, Alkalire (Sept.) ! Exsicc.—*Barter* 971 ; 1261. *Elliott* 207. *Dalz.* 180. *Lely* 638. *Anderson. Pomeroy* 1346. *Pobéguin* 331. (See Appendix).
2. **T. aethiopica** *Kotschy & Peyr.* Plant. Tinn. 25, t. 11—F.T.A. 5 : 497. Bot. Mag. tt. 5637, 6744 ; Holl. 3 : 536 ; Robyns l.c. 182. Undershrub up to 8–10 ft. high, with deep-almost black-purple flowers ½ in. long.
N. Nigeria : Katagum ! Bauchi Plateau, Zelau, 3,200 ft. (Apr.) ! Extends to E. Sudan and E. Africa to Nyasaland and Upper Congo Basin. Exsicc.—*Dalz.* 108. *Lely* 112.

### 10. ICOMUM Hua—F.T.A. 5 : 387.

Stems short-sparingly branched towards the top, subterete, shortly and softly pubescent when young ; leaves alternate, linear, obtuse, entire, glandular-punctate, up to 3·5 cm. long ; bracts broadly linear.. .. .. .. .. 1. *paradoxum*

Stems very short, softly tomentose when young ; young leaves oblong, with small glandular teeth, softly tomentellous ; bracts subulate-linear .. 2. *gambicolum*

1. **I. paradoxum** *Hua*—F.T.A. 5 : 387 ; Chev. Bot. 513. Stems slender 4–12 in. long from an oblong tuberous rootstock ; flowers ¼ in. long, white with rose-spotted lip.
French Guinea : Timbo Moussaya (June) ! Sineya (June) ! Toumanea (June) ! Futa-Jallon, several localities, 2,500–2,600 ft. (May) ! Exsicc.—*Miquel* 43. *Pobéguin* 288 ; 705 ; 738.
2. **I. gambicolum** *A. Chev.* Bot. 513, name only. Plant only a few inches high from a perennial base, with ovoid fragrant tuber 2–2½ in. long ; flowers white.
French Guinea : Futa-Jallon, at sources of the Gambia R., 3,300 ft. (Apr.) ! Exsicc.—*Chev.* 13573.

### 11. AEOLANTHUS Mart.—F.T.A. 5 : 388.

Stems strigillose-pubescent, at length glabrous ; leaves spathulate-oblong or spathulate-lanceolate, rounded at the apex, broadly and shortly cuneate at the base, up to 6 cm. long and 2·5 cm. broad including the rather long petiole, subentire, minutely glan-

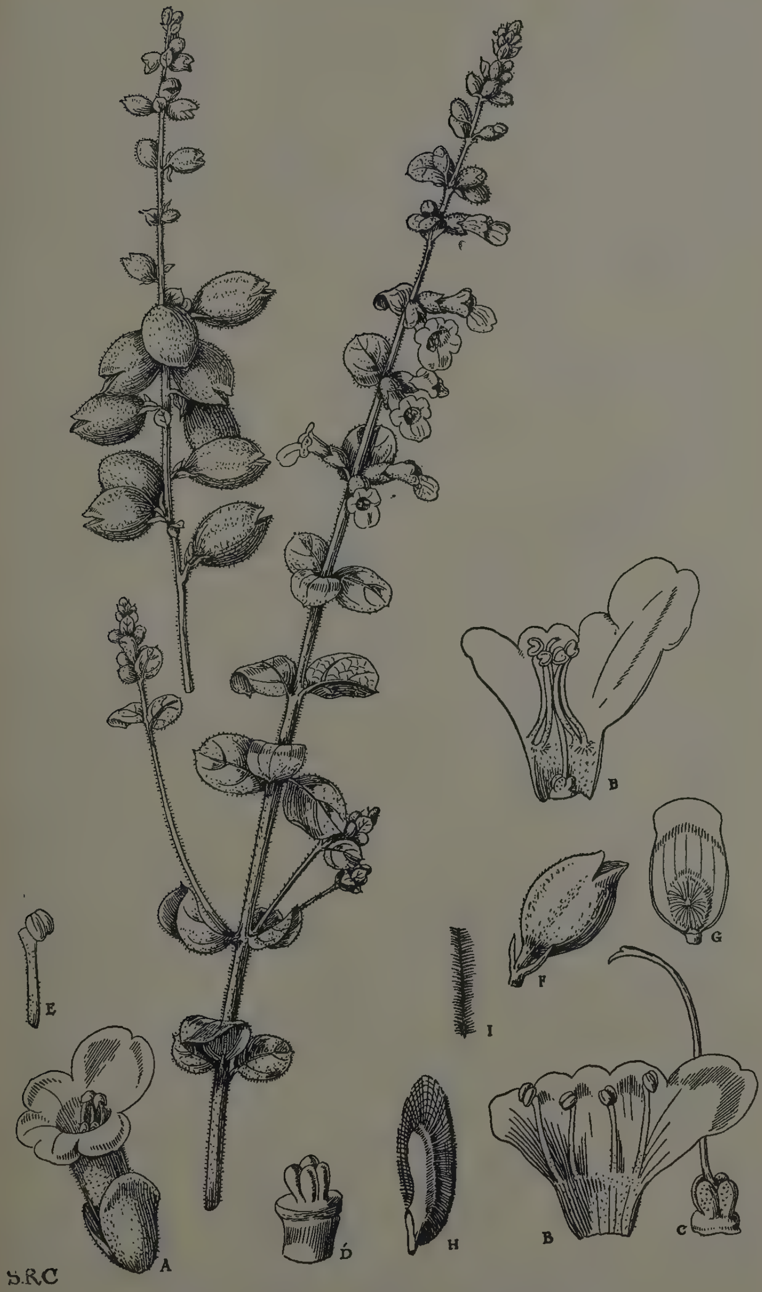

FIG. 275.—TINNEA BARTERI *Gürke* (LABIATAE).

A, flower. B, corolla laid open. C, pistil. D, ovary. E, stamen. F, calyx in fruit. G, same in section showing fruit. H, nutlet with part of hairs removed. I, hair from nutlet.

dular-punctate ; cymules forming a lax leafy panicle, the lateral branches trifurcate, branches slender, spicate up to 6 cm. long ; hardened calyx cupular 1. *pubescens*

Stems pilose ; leaves sessile, lanceolate, rounded at both ends, 3·5–6 cm. long, 1–1·5 cm. broad, thinly pilose, entire or sinuate-dentate ; cymules densely paniculate, softly villous ; bracts narrowly oblong, ciliate ; hardened calyx disk-like 2. *heliotropioides*

1. **A. pubescens** *Benth.*—F.T.A. 5 : 394 ; Holl. 3 : 529. *A. Buettneri* Gürke. *A. Chevalieri* Briq. ; Chev. Bot. 521. Erect branched annual 1–3 ft. high, with 4-angular glandular-pubescent stems sometimes vinous-tinged, odorous, with small lilac or bluish flowers ; sometimes cultivated.

French Sudan : Koulikoro (Oct.) ! French Guinea : Kouroussa ! Sierra Leone : Bumban hills, 1,000 ft. ! Benikoro, 1,000 ft. (Oct.) ! Kanya, 1,500 ft. (Oct.) ! Togo : Bismarckburg ! Ketschenko savannah. N. Nigeria : Lokoja, top of Patti and other rocky hills (Sept., Oct.) ! Nupe ! Abinsi, in Munchi farms (Dec.) ! Yola, cultivated in native compounds ! Bauchi Plateau : Naraguta (Aug.) ! S. Nigeria : Abeokuta ! Exsicc. —*T. Vogel* 174. *Barter* (no number). *Irving* 112. *Dalz.* 106 ; 302 ; 719. *Lely* 494. *Chev.* 2778. *Buettner* 250. (See Appendix).

2. **A. heliotropioides** *Oliv.*—F.T.A. 5 : 393. A rather robust annual 2 ft. high.

N. Nigeria : Benue R., cultivated in Munchi farms ! Habitat E. Sudan and E. Africa. Exsicc.—*Sampson* 35. (See Appendix).

## 12. **HYPTIS** Jacq.—F.T.A. 5 : 447.

Flowers not in globose heads :

Inflorescence a lax or rather dense (but not continuous) raceme of cymules :

Inflorescence leafy, the lateral cymules very few-flowered, flowers rather large ; calyx-teeth subequal, subulate, the tube 6 mm. long, strongly 10-ribbed, thinly pubescent, ciliate within the mouth ; nutlets oblong, smooth ; leaves broadly ovate, rounded at the base, 4–5 cm. long, up to 4 cm. broad .. 1. *suaveolens*

Inflorescence not leafy, the lateral cymules one-sided with several to numerous small flowers ; calyx-teeth subulate, pubescent ; the tube 2·5 mm. long, 10-ribbed ; leaves ovate-elliptic, up to 8 cm. long and 4 cm. broad, toothed, softly tomentose 2. *pectinata*

Inflorescence a dense continuous spike up to 8 cm. long ; bracts linear-filiform, ciliate ; calyx-teeth subulate, the tube about 4 mm. long, strongly 10-ribbed, pubescent ; leaves lanceolate, acute, up to 8 cm. long and 3 cm. broad, closely gland-dotted below 3. *spicigera*

Flowers in globose heads :

Calyx-tube not truncate, the subulate-triangular lobes with a v-shaped sinus between ; leaves ovate-lanceolate, cuneate at the base, serrulate, gland-dotted below 4. *brevipes*

Calyx-tube truncate at the apex, with linear-filiform lobes ; leaves as above, but densely gland-dotted below and setose on the nerves .. .. 5. *atrorubens*

1. **Hyptis suaveolens** *Poit.*—F.T.A. 5 : 449 ; Stapf 644 ; Chev. Bot. 523. Erect branched herb with white-pilose stems up to 4 ft. high, strongly odorous ; flowers dark blue-purple ; a weed of cultivated ground chiefly.

Senegal ! Gambia ! French Guinea : Konakry (Feb.) ! Sierra Leone : common ! Liberia : Monrovia ! N. Nigeria : Bauchi Plateau, Bichikki, 2,200 ft. (May) ! S. Nigeria : Lagos ! Native of tropical America, widespread in the tropics. Exsicc.—*Garrett* ex *Herb. Sc. Elliot* 5850. *Whyte.* *Farmar* 156. *Dalz.* 1366. *Lely* 183. *N. W. Thomas* 5362. *Brooks* 22. (See Appendix).

2. **H. pectinata** *Poit.*—F.T.A. 5 : 448 ; Holl. 3 : 533 ; Chev. Bot. 522. Erect branched annual, woody below, with pubescent stems sometimes up to 10 ft. high, and very small flowers, whitish and pink-tinged or pale purplish in small one-sided cymes.

Sierra Leone to N. and S. Nigeria, a weed of fields and open grasslands ! Native of tropical America, widespread. Exsicc.—*Barter* 941. *Irving.* *Dawodu* 207. *Sc. Elliot* 4667. *Dalz.* 354 ; 774. *Lely* 219. *Preuss* 1100. *Warnecke* 16. (See Appendix).

3. **H. spicigera** *Lam.*—F.T.A. 5 : 448 ; Holl. 3 : 534 ; Chev. Bot. 523. Erect branched odorous annual, woody below, 1–5 ft. high, with 4-angular stems often purple-tinged and small white flowers.

French Sudan : Koulikoro and district ; Ségou. Senegal ! Gambia ! Sierra Leone : Samu, near Luseniya (Dec.) ! Magbile (Dec.) ! N. Nigeria : Nupe ! Kontagora (Nov.) ! Sokoto (Dec.) ! Bauchi Plateau (Nov.) ! Tropical Africa, America and the Mascarenes. Exsicc.—*Heudelot* 121. *Barter* 1282. *Ingram.* *Sc. Elliot* 4238. *Dalz.* 136. *Lely* 715. *Brooks* 23. (See Appendix).

4. **H. brevipes** *Poit.*—F.T.A. 5 : 447 ; Stapf 643 ; Chev. Bot. 522. Erect branched annual, sometimes straggling, with 4-angular stem, up to 3–4 ft. high, and small white and red-spotted flowers in round compact axillary heads, the calyx-teeth spinescent.

A common tropical weed. Exsicc.—*T. Vogel* 22 ; 71. *Barter* 1130 ; 1284. *Sc. Elliot* 3969 ; 4348. *Whyte.* *Dawodu* 316. *Dalz.* 697 ; 1245. *Chipp* 504. *Preuss* 1300.

5. **H. atrorubens** *Poit.*—F.T.A. 5 : 447 ; Stapf 644 ; Chev. Bot. 522. Procumbent or ascending with slender stems, pubescent, with white flowers in peduncled heads $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter.

Senegal ! French Guinea : Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Sept.–Oct.). Sierra Leone : Kitchom, Scarcies R. (Dec.) ! Yetaya (Sept.) ! Kanya (Oct.) ! Kennema (Nov.) ! Liberia : Kakatown ! Ivory Coast : Cavally Basin, Grabo. Also in N. Rhodesia, and in tropical America. Exsicc.—*Heudelot* 922. *Morson.* *Sc. Elliot* 4343. *Whyte.* *N. W. Thomas* 2329 ; 3053. *Deighton* 415.

## 13. **LAVANDULA** Linn.—F.T.A. 5 : 449.

An erect branched perennial herb with acutely 4-angled glabrous stems ; leaves sessile, 1·5–2 cm. long, pinnately divided into narrow-linear segments ; spikes slender, cylindric, 2–6 in. long, forming lax panicles 30 cm. or more long ; bracts subpersistent, lanceolate, half as long as the calyx, the upper ones not dilated ; calyx cylindric, subequally toothed, tomentellous, with many close ribs ; corolla twice as long as the calyx-tube, pubescent outside .. .. .. .. .. *coronopifolia*

**L. coronopifolia** *Poir.*—F.T.A. 5 : 450. About 2 ft. high, stems green, with very few leaves and small lavender-bluish flowers.
French Sudan : 10 miles north of Abelessa (Mar.) ! Extends to Nubia and Eritrea. Exsicc.—*Chipp* 44.

### 14. OCIMUM Linn.—F.T.A. 5 : 334.

Racemes composed of distant whorls :

Axis of the inflorescence, pedicels and calyx clothed with long white hairs ; leaves rather long-petiolate, lanceolate to oblong-lanceolate, acute at both ends, up to 6 cm. long and 2 cm. broad, markedly punctate-glandular below ; racemes spike-like, strict, solitary to several in a panicle, up to 15 cm. long .. 1. *americanum*

Axis of the inflorescence, pedicels and calyx with short hairs or shortly tomentose :

Calyx-tube glabrous or nearly so within the margin :

Leaves more or less ovate or obovate, acutely acuminate, acutely cuneate and unequal-sided at the base, 6–12 cm. long, 3–6 cm. broad, crenate-serrate except the cuneate base, long-petiolate, gland-pitted below and slightly pubescent on the nerves ; racemes paniculate, up to 15 cm. long ; pedicels puberulous ; calyx-lips mucronate, the upper broadly obovate, about 6 mm. long in fruit .. 2. *viride*

Leaves linear-lanceolate, distantly serrate, 3–6 cm. long, 0·5–1 cm. broad, shortly pubescent ; racemes with leafy bracts ; axis, pedicels and calyx setulose-pubescent with white hairs ; calyx narrowly tubular, the upper lip suborbicular, with recurved sides .. .. .. .. .. .. .. 3. *tereticaule*

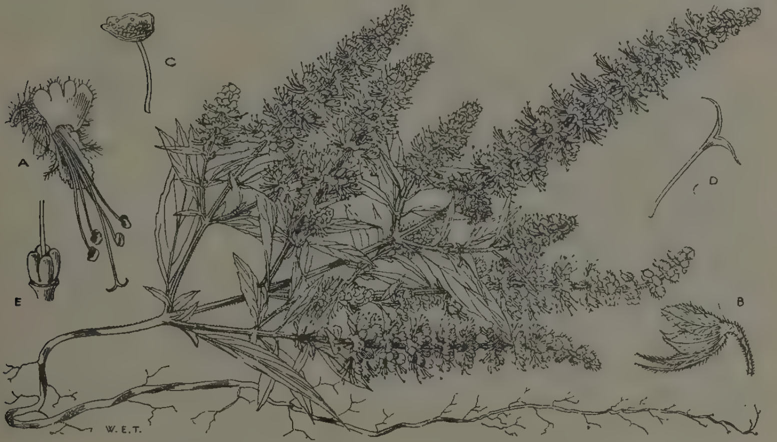

FIG. 276.—OCIMUM AMERICANUM *Linn.* (LABIATAE).
A, flower. B, calyx. C, stamen. D, upper part of style. E, ovary.

Calyx-tube softly tomentose with white hairs within the margin, 6 mm. long ; leaves linear, entire or subentire, glabrous or slightly pubescent, 2·5–6 cm. long, 0·4–1·6 cm. broad ; stamens long-exserted ; corolla about 1·8 cm. long 4. *knyanum*

Racemes dense, whorls continuous except at the base ; inflorescence brownish-pubescent ; calyx upper lip ovate, apiculate, 7 mm. long in fruit ; lower teeth small deltoid ; leaves ovate to ovate-lanceolate, acutely acuminate, 7–10 cm. long, 2–4 cm. broad, crenate, petiole 1–3 cm. long, slightly pubescent on both surfaces 5. *trichodon*

1. **Ocimum americanum** *Linn.* Sp. Pl. Ed. 2 : 833. *O. basilicum* Baker—F.T.A. 5 : 336, partly, not of Linn. *O. menthaefolium* A. Chev. Bot. 512, not of Hochst. *O. canum* Sims—F.T.A. 5 : 337 ; Holl. 3 : 528 ; Chev. Bot. 511. Erect much-branched more or less woody below, 1–2 ft. or more high, whitish-pubescent, strongly scented ; with white flowers in racemes 3–6 in. long composed of whorls.
Wild and often cultivated in tropical Africa and Asia ! Exsicc.—*T. Vogel* 32 ; 80. *Barter* 868. *Baikie. Irving* 131. *Miss Turner. Moloney. Ozanne. Brown* 345. *Dawodu* 270. *Warnecke.* (See Appendix).
2. **O. viride** *Willd.*—F.T.A. 5 : 337 ; Stapf 643 ; Holl. 3 : 528 ; Chev. Bot. 512. *O. Caillei* Chev. Bot. 511. *O. gratissimum* var. *macrophyllum* A. Chev. Bot. 511. Erect undershrub 3–6 ft. high, with nearly glabrous stems and cream-white or yellowish flowers. "Tea Bush."
Senegal and French Guinea to Angola ; often cultivated ! Exsicc.—*T. Vogel* 4. *Barter* (no number). *H. H. Johnston* 78. *Sc. Elliot* 3950. *Johnson* 473. *Whyte. Dennett* 8. *Dalz.* 138 ; 773. (See Appendix).
3. **O. tereticaule** *Poir.*—F.T.A. 5 : 347 ; Chev. Bot. 512. Low erect herb up to 1 ft. high, woody below, pale-downy, strongly scented, with purple flowers.
French Sudan : Mossi, Ouahigouya (Aug.). Senegal ! Gold Coast : Accra, common (Mar., May) ! Extends to E. Sudan, Abyssinia, Somaliland and E. Africa. Exsicc.—*Heudelot* 168. *Leprieur. Dalz.* 26.

4. **O. knyanum** *Vatke*—F.T.A. 5 : 346, incl. var. *astephanum* Baker. *O. affine* A. Chev. Bot. 510, not of Hochst. Perennial erect herb from a woody base, 1–3 ft. high, with shortly pubescent ribbed stems becoming glabrous and conspicuous purple flowers ½–¾ in. long.
French Guinea: Kéméné, in the bush (Mar.)! Futa-Jallon, between Timbo and Ditinn (Sept.)! Dahomey: Djougou, between Pélébina and Djougou (May)! N. Nigeria: Nupe, Lom! Sokoto! Zaria! Bauchi Plateau, Naraguta, appearing after fires (Jan.)! Jos! Extends to Abyssinia, Somaliland, E. Africa, and to Angola and S.W. Tropical Africa. Exsicc.—*Barter* 1283. *Hill* 18. *Lely* 16; P. 27; 113. *Chev.* 12835; 18400; 23852.

5. **O. trichodon** *Baker*—F.T.A. 5 : 338. *O. dalabaense* A. Chev. Bot. 511. A pubescent undershrub, erect, much-branched, with whitish flowers in almost spike-like racemes 3–6 in. long, the whole plant odorous.
French Guinea: Futa-Jallon, Dalaba-Diaguissa, 3,000–3,500 ft. (Sept.–Oct.)! Timbo to Ditinn (Sept.)! Also in Uganda, Tanganyika and Nyasaland. Exsicc.—*Chev.* 18382; 18848.

## 15. **ORTHOSIPHON** Benth.—F.T.A. 5 : 365.

Upper bracts of the raceme neither enlarged nor coloured; leaves oblong-lanceolate, subacute, narrowed at the base, up to 8 cm. long and 3 cm. broad, minutely gland-dotted on both surfaces, more or less serrate except towards the base; racemes up to 30 cm. long, simple or with a pair of short basal branches; bracts ovate, long-acuminate, 4–5 mm. long; pedicels curved, pubescent, up to 5 mm. long; calyx bilabiate, adaxial lip suborbicular, the two lateral teeth quite short, the two abaxial teeth subulate and about 3 mm. long; tube 7 mm. long in fruit 1. *salagensis*

Upper bracts of the raceme enlarged and brightly coloured, broadly obovate; leaves linear-oblanceolate to broadly oblanceolate, up to 10 cm. long and 1·5 cm. broad, softly pilose on both sides, serrulate; racemes up to 25 cm. long, pilose; pedicels curved, up to 5 mm. long, pubescent; calyx bilabiate, adaxial lip broad and suborbicular 5 mm. long in fruit, the other four teeth subequal, filiform-subulate, 3 mm. long in fruit; corolla 1·5 cm. long; calyx-tube 6–7 mm. long in fruit 2. *bracteosus*

1. **O. salagensis** *Baker*—F.T.A. 5 : 368; Chev. Bot. 515. *O. atacorensis* A. Chev. *O. incisum* A. Chev. Bot. 515. *O. xylorrhizus* Briq.; Chev. Bot. 515. *Ocimum affine* Hochst. var. *bafingensis* A. Chev. Bot. 510. Erect herb 1–2½ ft. high, with slender 4-angled stems slightly pilose but soon glabrous, and red-purple flowers less than ½ in. long in whorls forming slender racemes, the enlarged calyx turning vinous-coloured.
French Sudan: Bama to Samandini (June)! Mossi, Ouagadougou to Ouahigouya, in cultivated ground (Aug.)! Ivory Coast: savannahs of the Sassandra and Bafing, near Dotou (May)! Gold Coast: N. Terr., Salaga! Tamale (Apr.)! Bantala, Kulpawn R. (Apr.)! Dahomey: Atacora Mts. from Pobégou to Birni, 1,600 ft. (June)! Somba, Toukountouna to Kototengou (June)! N. Nigeria: Kontagora (May)! Bauchi Plateau, Bichikki, 2,200 ft. (May)! Exsicc.—*Krause. Dalz.* 22; 360. *Kitson* 693. *Lely* 186. *Chev.* 944; 21776 bis.; 24120; 24698.

2. **O. bracteosus** *Baker*—F.T.A. 5 : 375; Hook. Ic. Pl. t. 455. *Bouetia ocymoides* A. Chev. Bot. 513. *Hemizygia bracteosus* Briq. *H. nigritiana* S. Moore. Erect, white-hairy, 1–3 ft. high, the leaves sometimes in whorls of 3, with pleasant odour, and white flowers ½–⅔ in. long with rose-red bracts.
Senegal! Dahomey: Agouagon (May)! Atacora Mts., Pobégou to Birni, 1,500 ft. (June)! N. Nigeria: Nupe, common! Duru forest, between Sokoto and Kano (Mar.)! Ruka (Feb.)! Zaria (Apr.)! Yola (May)! Bauchi Plateau, various localities! Wamba Division (Mar.)! S. Nigeria: Western Prov. dry zone! Extends to E. Africa and Nyasaland. Exsicc.—*Heudelot* 396. *Barter* 946. *Dalz.* 108; 285; 389. *Hill* 19. *Lely* 47, P. 112. *Dent Young* 212. *Kitson. Thornewill* 58. *Chev.* 23546; 23945. (See Appendix).

## 16. **GENIOSPORUM** Wall.—F.T.A. 5 : 350.

Calyx with 5 nearly equal lanceolate teeth or the upper one slightly broader; leaves oblong to ovate-lanceolate, sessile, crenate, subacute, up to 3 cm. long and 1 cm. broad, pubescent on the nerves below; flowers very small, crowded in short oblong sessile spike-like racemes forming a narrow panicle; bracts shorter than the calyx, ovate; corolla twice as long as the hairy calyx .. .. .. *paniculatum*

Calyx with 4 teeth, the lower broadly obovate, inflexed in fruit, the upper 3 deltoid; leaves ovate, the lower ones shortly petiolate, crenulate, 2–4·5 cm. long, 1–3 cm. broad, pubescent below, scabrid-pubescent above; flower-whorls in dense cylindrical racemes 2·5–10 cm. long; bracts ovate acuminate longer than the calyx, the lower ones large ovate coloured turning white; corolla twice as long as the calyx *paludosum*

1. **G. paniculatum** *Baker*—F.T.A. 5 : 351. *Hyptis quadrialata* A. Chev. Bot. 522. Stems erect, 4-angled, from a woody base, pubescent, with very small crowded pubescent flowers.
French Guinea: Kissi, Mansonia (Feb.)! N. Nigeria: Bauchi Plateau, Vom, 3,000–4,500 ft! Also in Angola and Uganda. Exsicc.—*Dent Young* 211. *Chev.* 20684.

2. **G. paludosum** *Baker*—F.T.A. 5 : 352. *Ocimum konianense* A. Chev. in Bull. Soc. Bot. Fr., Mém. 8d : 198; Bot. 511. Erect perennial 2–3 ft. high, with 4-sulcate densely pubescent stems, and lilac or blue-purple flowers with coloured bracts.
Ivory Coast: Beyla, by a marsh (Mar.)! N. Nigeria: plains between Bukuru and Hepham, 4,300 ft. (Aug.)! Vom! Also in E. Africa extending to N. Rhodesia. Exsicc.—*Lely* 345. *Dent Young* 210. *Chev.* 20869.

*Note.*—*G. paludosum* has a 4-lobed calyx in common with several other African species, the corolla and habit resembling that of *Ocimum*. The type species of the genus is the Indian *G. prostratum* Benth., which has an irregularly 5-toothed calyx as in *G. paniculatum*.

## 17. **MOSCHOSMA** Reichb.—F.T.A. 5 : 352.

Stems obtusely to subacutely quadrangular, glabrous; leaves long-petiolate, ovate-rhomboid, long- and gradually-acuminate, cuneate and entire at the base, otherwise crenate-serrate, about 6 cm. long and 3 cm. broad, closely and minutely gland-dotted; racemes of whorls slender, sometimes forming a leafy panicle; whorls 6-

flowered ; pedicels short, puberulous, articulating at the top ; bracts minute ; calyx gland-dotted .. .. .. .. .. .. .. .. *polystachyum*

**M. polystachyum** *Benth.*—F.T.A. 5 : 353 ; Chev. Bot. 515. Much branched herb often stout-stemmed, 1–3 ft. high, with very small whitish or light purplish flowers ; a weed of gardens or luxuriant in moist river-beds.
Gold Coast : Cape Coast (July) ! Ashanti, Amentia, in forest ! N. Nigeria : Nupe ! Katagum (Nov.) ! S. Nigeria : Lagos (July) ! Oban ! Widely spread in the Old World tropics. Exsicc.—*T. Vogel* 44. *Barter* 1167. *Rowland.* *Dalz.* 111 ; 1402. (See Appendix).

## 18. ACROCEPHALUS Benth.—F.T.A. 5 : 354.

Branches glabrous, dark-purple, terete ; leaves ovate or ovate-lanceolate, acutely acuminate, sessile, 2–3 cm. long, 1–1·5 cm. broad, glabrous, leathery, serrulate ; flower-heads numerous, corymbose ; branches of the corymb short ; bracts ovate-reniform, broadly apiculate, densely tomentose outside, with glabrescent margins, about 6 mm. long .. .. .. .. .. .. .. 1. *alboviridis*

Branchlets tomentellous or villous :

Hairs on the stem and branchlets short (tomentellous or shortly tomentose) :

Bracteate leaves subtending the flower-heads green (not creamy white) :

Leaves linear, rather thinly appressed-pubescent below, 3–5 cm. long, 3–5 mm. broad, closely glandular-punctate below ; flower-heads densely crowded, ellipsoid, 1–1·5 cm. long, about 1 cm. diam. ; bracts villous all over 2. *Heudelotii*

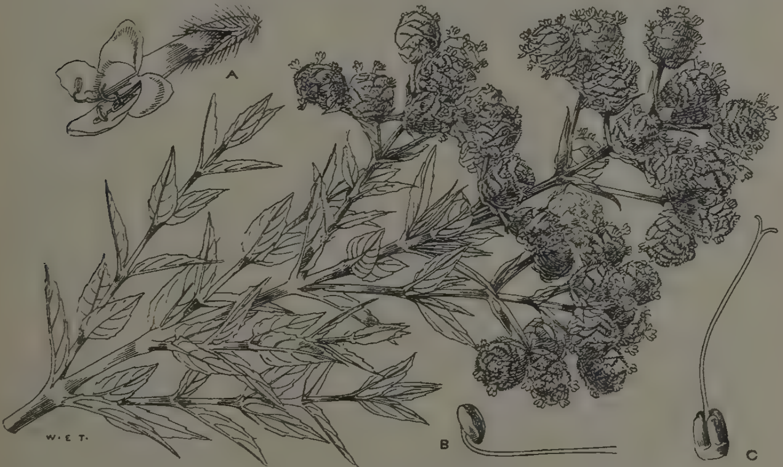

FIG. 277.—ACROCEPHALUS ALBOVIRIDIS *Hutch.* (LABIATAE).
A, flower. B, stamen. C, pistil.

Leaves broadly lanceolate, strongly nervose, densely appressed-tomentose on both surfaces, 3–5 cm. long, 1–1·5 cm. broad, subentire, distinctly petiolate ; flower-heads crowded, subglobose, about 1 cm. diam. ; bracts densely villous all over the outside .. .. .. .. .. .. .. .. 3. *Buettneri*

Bracteate leaves subtending the flower-heads creamy-white, spathulate-lanceolate, acute, up to 2 cm. long ; leaves linear-oblanceolate, subacute, narrowed into a short petiole, serrulate, sparingly setulose, punctate-glandular on both surfaces ; flower-heads densely corymbose, shortly oblong-elliptic, 1·5 cm. long ; bracts densely villous outside .. .. .. .. .. .. .. 4. *lagoensis*

Hairs on the stem and branches long and weak (long-pilose) :

Leaves linear to linear-lanceolate, acute, up to 10 cm. long and 1 cm. broad, serrulate, pilose on the nerves, glandular-punctate on both surfaces ; flower-heads few to many, rather laxly corymbose, the subtending bracts creamy white and ovate-spathulate .. .. .. .. .. .. .. .. .. 5. *lilacinus*

Leaves lanceolate, subacute, 3–5 cm. long, 1–1·5 cm. broad, serrulate, thinly pilose on both surfaces, densely glandular below ; flower-heads few or subsolitary, small, globose, the subtending leaves not coloured .. .. .. 6. *ramosissimus*

1. **Acrocephalus alboviridis** *Hutch.* in Kew Bull. 1921 : 396. Erect branched woody plant up to 3–4 ft. high, with black-purple stems and light purplish flowers in pale-tomentose heads $\frac{1}{2}$ in. in diameter.
N. Nigeria : Bauchi Plateau, Ropp, 4,600 ft. (July) ! Vom, 3,000–4,500 ! Exsicc.—*Lely* 456. *Dent Young* 207.

2. **A. Heudelotii** *Briquet*—F.T.A. 5 : 361 ; Chev. Bot. 514. Erect, branched, woody, finely-pubescent, 1–2 ft. high, with leaves almost whorled and flower-heads subglobose or oblong with whitish or pale violet flowers.
Senegal : Casamance, etc. ! French Guinea : Rio Nunez ! Futa-Jallon, etc., many localities. Sulimania, Erimakuna, on alluvial mud (Mar.) ! Also in E. Sudan. Exsicc.—*Heudelot* 620. *Sc. Elliot* 5262.
3. **A. Buettneri** *Gürke*—F.T.A. 5 : 360 ; Chev. Bot. 514. Erect robust plant with 4-angular stems, pale silky-tomentose, and whitish flowers in villous heads ⅓ in. in diameter.
Togo : Bismarckburg ! Exsicc.—*Buettner* 304.
4. **A. lagoensis** *Baker*—F.T.A. 5 : 360 ; Chev. Bot. 514. Erect branched more or less woody with densely pubescent stems and purplish flowers in villous heads with cream-white bracts.
Ivory Coast : Anoumaba (Nov.) ! S. Nigeria : Lagos Colony ! Cross River district (Jan.) ! Exsicc.—*Rowland*. *Holl*. 206. *Chev*. 22390.
5. **A. lilacinus** *Oliv.* in Trans. Linn. Soc. 29 : 135, t. 134. *A. polytrichus* Baker. *A. centratheroides* Baker. *A. crinitus* Briq. ; Chev. Bot. 514. *A. sordidus* Briq.—A. Chev. Bot. 514. Erect branched woody 1–4 ft. high, pilose with lavender flowers in pubescent heads ⅓–½ in. in diameter with white or lilac-coloured bracts.
French Sudan : Koulikoro ! Senegal : Casamance, Sedhiou (Feb.) ! Gold Coast : Afram Plains (Dec.) ! N. Terr., Adefi ! Togo : Kpedsu (Dec.) ! N. Nigeria : common ! S. Nigeria : Oban ! Extends to Upper Nile Land, Uganda and E. Africa. Exsicc.—*Barter* 894. *Baikie*. *Elliott* 15 ; 212. *Talb*. 968. *Krause*. *Chev*. 2781.
6. **A. ramosissimus** *A. Chev*. in Journ. de Bot. 1909 : 120 ; Chev. Bot. 514. Herb 18 in. high, pilose with spreading glandular hairs, pale-mauve flowers in small heads ¼ ⅓ in. in diameter.
French Guinea : Futa-Jallon, Dalaba-Diaguissa, 3,000–4,000 ft. (Oct.) ! N. Nigeria : Bauchi Plateau, Naraguta and Jos (Sept.) ! Vom, 3,000–4,500 ft. ! Exsicc.—*Lely* 577. *Dent Young* 208. *Chev*. 18698 ; 18898 ; 18899.

### 19. PYCNOSTACHYS Hook.—F.T.A. 5 : 379 ; Perkins in Notizbl. Bot. Gart. Berl. 8 : 63 (1921).

Leaves sessile, linear, rather distantly serrulate, up to 10 cm. long and 6 mm. broad, minutely scabrid and glandular-punctate ; spikes terminal, pedunculate, 2–6 cm. long, about 2 cm. diam. .. .. .. .. .. .. .. 1. *togoensis*

Leaves fairly long-petiolate, lanceolate, broadly acuminate, long-cuneate and entire at the base, about 10 cm. long and 2 cm. broad, crenate-serrate, shortly pubescent above and on the nerves below, closely glandular-punctate ; spikes as above but with a shorter peduncle .. .. .. .. .. .. .. 2. *Volkensii*

1. **P. togoensis** *Perkins* l.c. 69. *P. Schweinfurthii* Baker—F.T.A. 5 : 380, partly, not of Briq. Erect branched herb (from a woody base) with pale 4-angled pubescent stems 2 ft. high, and pale blue flowers ½ in. long in very dense spikes 1–2 in. long bristly with the spine-tipped calyx-lobes.
Gold Coast : N. Ashanti, Dukweisin (Dec.) ! Afram Plains (Dec.) ! Togo : Kratschi ! Exsicc.—*Krause*. *Chipp* 621. *Irvine* 890.
2. **P. Volkensii** *Gürke*—F.T.A. 5 : 384 ; Perkins l.c. 74. *P. bowalensis* A. Chev. Bot. 521. Branched herbaceous undershrub with 4-angled pubescent stems 4–8 ft. high, and bluish-purple flowers ⅓ in. long in spikes like the preceding.
French Guinea : Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Sept.–Oct.) ! Dalaba to Mamou (Jan.) ! Cameroons Mt., 6,000–7,000 ft., in ravines above the forest (Dec., Jan.) ! Fernando Po, 7,000 ft. ! Also on mountains of Somaliland and E. Africa to Nyasaland. Exsicc.—*Mann* 280 ; 1222 ; 1960. *Johnston* 37. *Dunlap* 207. *Preuss* 688. *Chev*. 18853 ; 20343.

### 20. PLECTRANTHUS L'Hérit.—F.T.A. 5 : 398.

Pedicels filiform, 1–1·5 cm. long :

Leaves sessile, oblanceolate, slightly dentate, about 2·5 cm. long, with a tuft of hairs in their axils ; inflorescence of slender panicles distributed along the stems ; whorls 1–2-flowered, 4–8 mm. apart ; calyx 4 mm. long, setulose-pubescent, the two lower teeth subulate and a little longer than the other triangular ones .. 1. *tenuis*

Leaves long-petiolate, broadly ovate, cordate at the base, acuminate, deeply crenate, up to 10 cm. long, with a few adpressed hairs on both surfaces ; inflorescence a racemose panicle ; whorls 6-flowered, remote ; calyx 3 mm. long in flower, clothed with long hairs, upper tooth broader, ovate-deltoid, acute, the others subequal, deltoid, acuminate .. .. .. .. .. .. .. 2. *kamerunensis*

Pedicels much shorter than above ; inflorescence a panicle or raceme of small cymules :

Panicle with smaller foliage leaves scattered throughout ; cymules dichotomous ; flowers very small ; calyx densely pubescent ; leaves ovate, about 4 cm. long and 2·5 cm. broad, crenate, closely gland-dotted below and shortly pubescent on the nerves .. .. .. .. .. .. .. .. .. 3. *ramosissimus*

Panicle without leaves or with them only towards the base :

Flowers fasciculate on the main axis or on a very short common peduncle :

Calyx 2–3 mm. long in fruit ; leaves very small, ovate, crenate, rather thick, pubescent and gland-dotted ; cymules 1–3-flowered, sessile, pedicels 2–4 mm. long 4. *minimus*

Calyx about 1 cm. long in fruit ; leaves cordate, ovate, about 7 cm. long and 5 cm. broad, crenate, glandular below and setulose on the nerves ; corolla 1·3 cm. long 5. *Mannii*

Calyx 2 cm. long in fruit ; leaves narrowly obovate, narrowed to the base, serrate, about 15 cm. long and 7 cm. broad, obscurely glandular below ; corolla 2 cm. long 6. *insignis*

Flowers in racemes or pedunculate cymes on the main axis :

Flowering shoots leafless, armed with small prickles .. .. 7. *denudatus*

Flowering shoots leafy, at least at the base :

Inflorescence a narrow panicle, the compound cymes very short and rather distant, about 1 cm. long .. .. .. .. .. .. .. .. 8. *bongensis*

Inflorescence a lax spreading or pyramidal panicle, the cymes simple or slightly compound, about 2 cm. long :
  Stems densely glandular, indumentum of short hairs ; calyx up to 2 mm. long ; leaves cordate-ovate, acute, deeply crenate-dentate, up to 13 cm. long and 12 cm. broad ; petioles almost as long as the leaves .. 9. *glandulosus*
  Stems sparsely glandular, indumentum of long spreading white hairs ; calyx about 3–4 mm. long ; leaves very much as above, but usually more deeply cordate .. .. .. .. .. .. .. .. 10. *urticoides*

1. **Plectranthus tenuis** *Hutch. & Dandy* in Kew Bull. 1926 : 481. *P. ramosissimus* A. Chev. Bot. 516, not of Hook. f. *Englerastrum diffusum* Alston. A slender branched decumbent herb, loosely pilose, leaves caducous, with very small blue flowers, the calyx only slightly bilabiate even in fruit.
   French Guinea : Sorémodou, at Niger sources (Jan.) ! N. Nigeria : Nupe ! Muri Prov., in farms (Nov.) ! Mada Hills, 2000 ft. ! Exsicc.—*Barter* (no number). *Lamb* 72. *Chev.* 20567. *Hepburn* 92.
2. **P. kamerunensis** *Gürke*—F.T.A. 5 : 408. Stems branched 3–4 ft. long, pubescent, with small violet flowers.
   Cameroons Mt., near West Buea, 3,200 ft. Exsicc.—*Preuss* 1039 (not seen).
3. **P. ramosissimus** *Hook. f.*—F.T.A. 5 : 418. Erect branched herb, 6–12 ft. high, with sharply angled pilose stems and copious glandular-pubescent inflorescence of small whitish flowers.
   Cameroons Mt., 3,000–7,000 ft. (Nov., Jan.) ! Fernando Po, 5,000 ft. (Dec.) ! Exsicc.—*Mann* 624 ; 1320 ; 1996. *Johnston* 102. *Dunlap* 57 ; 120 ; 213.
4. **P. minimus** *Gürke*—F.T.A. 5 : 403. Stems erect, very slender, pubescent, 1–4 in. long.
   Cameroons Mt., near Buea, 7,000 ft. Exsicc.—*Preuss* 1019 (not seen).
5. **P. Mannii** *Baker*—F.T.A. 5 : 408. Erect branched pilose herb 6–8 ft. high, with flowers ⅓–½ in. long in long racemose panicles.
   Cameroons Mt., 3,000 ft. (Dec.) ! Exsicc.—*Mann* 1947.
6. **P. insignis** *Hook. f*—F.T.A. 5 : 404. Tall herbaceous undershrub 10–15 ft. high or more or less climbing, with shortly pubescent fairly stout stems, large leaves and yellowish flowers ½–¾ in. long in narrow racemose panicles usually when leafless.
   Cameroons Mt., 6,000–7,000 ft. (Dec., Jan.) ! Exsicc.—*Mann* 1257. *Dunlap* 4 ; 51.
7. **P. denudatus** *A. Chev.* Bot. 516, name only. Herb 1 ft. or more high, more or less glandular-pubescent, with small purple-blue flowers in a panicle.
   Senegal : Casamance ; Floup-Fedyan (Jan.) ! Sierra Leone : ? locality ! Exsicc.—*Sc. Elliot* 4826. *Chev.* 2815.
8. **P. bongensis** *Baker*—F.T.A. 5 : 410. *Coleus copiosiflorus* Briq. and *C. phymatodes* Briq. *ex* Chev. Bot., 519,520. Erect herb with glabrous 4-angled stems ; flowers bluish-purple, ¼–⅓ in. long in narrow lax panicles 6–12 in. long.
   French Sudan : Koulikoro (Oct.) ! Also in Upper Nile Land. Exsicc.—*Chev.* (no number).
9. **P. glandulosus** *Hook. f.*—F.T.A. 5 : 411. *P. hylophilus* Gürke. Erect branched herb, 6–10 ft. high, glandular-pubescent, with blue or violet-purplish flowers ⅓–½ in. long in copious panicles.
   Cameroons Mt., 5,000–7,200 ft., near Mann's Spring, etc. (Dec., Jan.) ! Fernando Po, 7,000 ft. ! Exsicc.—*Mann* 318 ; 2029. *Dunlap* 41. *Preuss* 815.
10. **P. urticoides** *Baker*—F.T.A. 5 : 412. *P. Almamii* A. Chev.—Chev. Bot. 516. Erect herb 3–5 ft. high, robust with hairy quadrangular stems, very like the last but with white spreading hairs and slightly larger calyx.
   French Guinea : Futa-Jallon, various localities ! Exsicc.—*Chev.* 12843, etc. (See Appendix).

### 21. **PLATYSTOMA** P. Beauv.—F.T.A. 5 : 349.

A slender erect annual ; stems slightly pubescent between the rounded angles ; leaves long-petiolate, ovate, about 5 cm. long and 2·5 cm. broad, serrate except the broad cuneate base, glabrous or nearly so ; racemes of numerous spaced whorls terminal, slender, up to 15 cm. long, about 8–10 mm. diam. ; flowers about 8 in a whorl ; bracts persistent, broadly ovate to obovate, foliaceous, nearly as long as the whorl ; pedicels short, puberulous .. .. .. .. .. .. .. .. *africanum*

**P. africanum** *P. Beauv*—F.T.A. 5 : 349 ; Chev. Bot. 513. *P. djalonense* A. Chev. Bot. 513, name only. Much branched erect, 1–2 ft. high, with very small white or pale blue flowers ; a common weed.
French Sudan : Koulikoro. French Guinea : Kouria to Longuery (Aug.) ! Sierra Leone to Cameroons and Fernando Po ! General in tropical Africa and in India. Exsicc.—*T. Vogel* 10 ; 213. *Ansell*. *Barter* 99.' *Morson*. *Irving* 83. *Burton* and *Cameron*. *Cummins* 168. *Dalz.* 139 ; 795. *Preuss* 1117. *Warnecke* 440. *Chev.* 14651. (See Appendix).

### 22. **SOLENOSTEMON** Schum. & Thonn.—F.T.A. 5 : 420.

Pedicels about 4 mm. long, much shorter than the calyx in fruit, subfasciculate on the axis :
  Stems decumbent, crispate-pubescent ; leaves small, ovate-triangular, about 1 cm. long, with about 5 coarse teeth on each side, pilose on the nerves and glandular ; pedicels puberulous ; calyx 3·5 mm. long in fruit .. .. 1. *decumbens*
  Stems erect, glandular and puberulous ; leaves often large, up to 12 cm. long and 10 cm. broad, broadly ovate, crenate-serrate, the upper subsessile, the lower long-petiolate, laxly or densely glandular or puberulous ; pedicels and calyx puberulous ; calyx 5–6 mm. long in fruit .. .. .. .. .. .. 2. *ocymoides*
Pedicels about 8–10 mm. long, longer than the calyx in fruit, on a short common peduncle :
  Leaves long-petiolate, thin, broadly ovate-rhomboid, cuneate-subtruncate at the base, 8–12 cm. long, up to 9 cm. broad, coarsely dentate, with very prominent parallel tertiary nerves and very closely glandular below ; petiole up to 7 cm. long ; pedicels minutely puberulous-glandular ; calyx 7–8 mm. long, puberulous ; corolla 1·5 cm. long .. .. .. .. .. .. .. .. .. .. 3. *cymosus*
  Leaves shortly petiolate :
    Leaves thick, triangular-ovate, shortly cuneate at the base, 3–5 cm. long, glandular

below ; petiole about 5 mm. long ; pedicels slender, puberulous ; calyx about 3 mm. long, puberulous ; corolla 1·5 cm. long .. .. .. .. 4. *Mannii*

Leaves broadly oblanceolate, acute, long-cuneate at the base, 5–8 cm. long, 1·5–2·5 cm. broad, serrate, glandular-punctate below ; petiole very short ; pedicels glabrous ; calyx about 4 mm. long in fruit .. .. .. 5. *Chevalieri*

1. **Solenostemon decumbens** *Baker*—F.T.A. 5 : 421. Perennial herb with simple stems ascending from a decumbent base, and blue flowers ½ in. long in whorls forming a raceme 2–4 in. long.
Cameroons Mt., grasslands 7,000–8,000 ft. (Nov.) ! Exsicc.—*Mann* 2002. *Johnston* 79.

2. **S. ocymoides** *Schum. & Thonn.*—F.T.A. 5 : 420, incl. var. *monostachyus* Baker ; Stapf 643 ; Holl. 3 : 530. Chev. Bot. 518. *S. graniticolus* A. Chev. Bot. 517. *S. gouanensis* A. Chev. l.c. *S. lateriticolus* A. Chev. l.c. Annual, branched, 1–4 ft. high, with 4-angular stem, small solid tuberous roots, leaves nettle-like sometimes with dark purple markings, and bluish-purple or reddish flowers in whorls forming a raceme up to 1 ft. long ; habit resembling *Coleus dysentericus*.
From Senegal and French Sudan to Cameroons ! Extending to Angola, St. Thomas Island, and to E. Sudan. Exsicc.—*T. Vogel* 8 ; 44. *Ansell*. *Barter* 1281. *Mann* 404. *Moloney*. *Dawodu* 10 ; 27. *Macgregor* 368. *Sc. Elliot* 3908 ; 5336. *Cummins* 9. *Johnson* 29. *Whyte*. *Dalz.* 102 ; 140 ; 772 ; 798 ; 799 ; 1079. (See Appendix).

3. **S. cymosus** *Baker* -F.T.A. 5 : 422. Herbaceous perennial with 4-angular glabrous stems up to 10–12 ft. high, and purplish flowers ⅔ in. long in lax whorls forming racemes up to 1 ft. long.
Cameroons Mt., forest, 1,000–3,000 ft. (Dec.) ! Exsicc.—*Mann* 1251.

4. **S. Mannii** *Baker*—F.T.A. 5 : 422. Glabrous herbaceous perennial 3 ft. high, with flowers ⅔ in. long in a lax raceme of whorls.
Cameroons Mt., forest, 5,000–6,000 ft. (Nov.) ! Exsicc.—*Mann* 1967.

5. **S. Chevalieri** *Briq.* ex *Chev.* Bot. 517, name only. *Coleus nigericus* A. Chev. Bot. 519. Herb, slightly branched, nearly glabrous, about 1 ft. high, with an oblong raceme-like panicle 3–4 in. long.
French Sudan : Koulikoro (Oct.) ! Exsicc.—*Chev.* (no number).

## 23. **LEOCUS** A. Chev. in Journ. de Bot. 1909 : 125.

Stems obtusely quadrangular, shortly pubescent ; leaves oblong-obovate, rounded at the apex, sessile and subauriculate at the base, about 10 cm. long, 3–4 cm. broad, crenulate, shortly scabrid-pubescent below, closely glandular ; flowers in a slender spike-like raceme up to 15 cm. long ; flowers fasciculate ; pedicels short, pubescent ; calyx mauve ; corolla 1–1·5 cm. long ; stamens 4, exserted .. .. *lyratus*

**L. lyratus** *A. Chev.* l.c. 126 ; Bot. 520. Erect perennial, with several root-tubers the size of a hazel-nut, and violet-purple flowers.
French Guinea : Futa-Jallon, Dalaba-Diaguissa Plateau, common near Dalaba, 3,000–4,000 ft. (Sept.–Oct.) ! Mt. Tinka, 3,900 ft., in savannah (Sept.) ! Exsicc.—*Chev.* 18824.

## 24. **ENGLERASTRUM** Briquet—F.T.A. 5 : 445 ; Hutchinson & Dandy in Kew Bull. 1926 : 479.

Racemes lax :
  Leaves subpersistent, sessile or subsessile, obtuse or at most subacute at both ends, ovate to suborbicular, crenulate or subentire, 2–2·5 cm. long, about 1·5 cm. broad ; whorls 1–3-flowered, 8–15 mm. apart .. .. .. .. 1. *djalonense*
  Leaves caducous, shortly petiolate, acute at both ends, obovate-lanceolate, entire or distantly serrate, 3–4 cm. long, 1–1·5 cm. broad ; whorls 1–3-flowered, 1–5 mm. apart .. .. .. .. .. .. .. .. 2. *Hutchinsonianum*
Racemes compressed, unilateral ; leaves caducous (not seen) ; whorls 1–2-flowered, 2 mm. apart .. .. .. .. .. .. .. .. 3. *nigericum*

1. **Englerastrum djalonense** *A. Chev.* in Journ. de Bot. 1909 : 127 ; Bot. 518. *E. rhodesianum* N.E.Br. A slender branched suberect or straggling herb, subsucculent, slightly pilose, with spreading diffuse glandular-pubescent inflorescence of slender branched racemes of very small blue flowers.
French Guinea : Futa-Jallon, Timbo to Ditinn and Kouria, on laterite plateaux (Sept.) ! Togo : Sokode, farm ! Also in N. Cameroons, Belgian Congo, Tanganyika, Nyasaland and N. Rhodesia. Exsicc.—*Chev.* 18495. *Schroeder* 66.

2. **E. Hutchinsonianum** *Alston* in Kew Bull. 1926 : 298. Habit of the last, with small blue flowers.
N. Nigeria : Lokoja, Mt. Patti, and in fields, etc. (Nov.) ! Exsicc.—*Dalz.* 105.

3. **E. nigericum** *Alston* l.c. Habit of the others, but racemes much more compressed and definitely one-sided.
Sierra Leone : Njala (Jan.) ! N. Nigeria : Katagum, near the town wall (Oct.) ! Exsicc.—*Dalz.* 109. *Deighton* 1569.

## 25. **COLEUS** Lour.—F.T.A. 5 : 422.

*Stems erect or suberect, not creeping :
  †Inflorescence a succession of loose fascicles, racemes or short cymules (not spike-like) :
    Flowering stems leafy :
      Leaves densely and softly tomentose below, broadly triangular-ovate, thick, markedly bullate on the upper surface, 3–4 cm. long ; cymules on the main axis rather distant and few-flowered, shortly pedunculate ; corolla 1 cm. long 1. *koualensis*
      Leaves glabrous or at most shortly and thinly pubescent or glandular, not bullate :
        Leaves linear, about 10–15 cm. long, minutely setulose on the upper surface ; inflorescence a branched panicle ; cymules raceme-like, up to 3 cm. long ; pedicels puberulous, 3–4 mm. long ; corolla 1·5 cm. long .. 2. *splendidus*
        Leaves lanceolate, narrowly oblanceolate or small and ovate-lanceolate, not more than 2 cm. broad :
          Upper leaves rounded at the base, distinctly petioled ; cymules umbelliform, forming long racemes :
            Petioles densely white-pilose ; leaves oblong-lanceolate, not reticulate, white-

pilose on the nerves and closely gland-dotted below, 12–16 cm. long, 3–6 cm. broad, crenulate; pedicels puberulous, crowded at the nodes, up to 2 cm. long in fruit; calyx almost 8–10 mm. long in fruit .. .. 3. *casamancicus*

Petioles minutely puberulous; leaves glabrous above, reticulate, softly puberulous and gland-dotted below, lanceolate, 10–12 cm. long, 4–4·5 cm. broad, crenate; pedicels pubescent, not so numerous as above, up to 1·5 cm. long in fruit; calyx about 6 mm. long in fruit .. .. .. 4. *reticulatus*

Upper leaves long-decurrent to the base, petioles not distinct:

Leaves not thin and flaccid, spathulate-oblanceolate, 4–6 cm. long, 1 cm. broad, setulose on both surfaces, serrulate; inflorescences subsimple but often several on each branch, up to 10 cm. long; lateral cymules very short and subfasciculate; pedicels 3 mm. long; fruiting calyx 5 mm. long 5. *djalonensis*

Leaves not thin and flaccid, ovate-lanceolate, 1–2·5 cm. long, sparingly setulose and markedly gland-dotted below, serrulate; inflorescence simple, the lateral cymules raceme-like, up to 2 cm. long; calyx-teeth very sharp 6. *tenuicaulis*

Leaves more or less ovate or broadly obovate, 2 cm. or more broad:

Inflorescence composed of dichotomous cymules mostly paired at the nodes, the branches of the cymules raceme-like; stems minutely puberulous; leaves narrowly ovate-elliptic, subacute, up to 10 cm. long, long-petiolate, dentate; pedicels about 5 mm. long .. .. .. .. .. 7. *Peulhorum*

Inflorescence very narrow and composed of sessile or subsessile fascicles:

Leaves thin, long-petiolate or long-decurrent at the base of the blade, up to 16 cm. long and 7 cm. broad, crenulate-serrate, puberulous on the nerves below; flower-clusters rather distant; adaxial calyx-lobe broadly ovate, recurved and strongly nerved; corolla about 1 cm. long.. .. .. 8. *decurrens*

Leaves thin, broadly cuneate at the base, 6–8 cm. long, 4–5 cm. broad, coarsely crenate, gland-dotted below; lower bracts leafy, ovate; corolla 2 cm. long, with a slender tube; rootstock a creeping rhizome .. 9. *dissitiflorus*

Leaves subsucculent, shallowly crenate; rootstock tuberous; leaf-blade ovate, cuneate-decurrent at the base, up to about 6 cm. long and 4 cm. broad, with scattered dark glands below and ascending nerves; flowers very small; pedicels puberulous; corolla about 8 mm. long .. .. 10. *dysentericus*

Leaves subsessile or shortly petiolate, rounded at the base, ovate, serrate, 2·5–4 cm. long, 1·5–3 cm. broad, rather densely and very distinctly glandular below, and setulose on the nerves; flower-clusters very distant, about 5 to each inflorescence; adaxial calyx-lobe ovate, the others subulate; corolla 7–8 mm. long .. .. .. .. .. .. .. 11. *glandulosus*

Flowering stems leafless; inflorescence of short simple lateral racemes up to 5 cm. long; leaves oblong-lanceolate, rounded at the apex, sessile, up to 7 cm. long and 2·5 cm. broad, setulose on the nerves below, entire or more or less crenate; calyx about 8 mm. long in fruit, strongly ribbed, setulose on the ribs; corolla 1·5 cm. long .. .. .. .. .. .. .. .. .. .. 12. *dazo*

††Inflorescence close, continuous, spike-like, 2–4 cm. long, about 1·5 cm. diam.; calyx tubular, strongly ribbed, 6 mm. long:

Calyx thinly pubescent; stems softly puberulous, terete; leaves ovate-triangular, closely crenate, rounded at the base, about 8 cm. long and 5 cm. broad, closely puberulous-tomentellous below .. .. .. .. .. .. 13. *Caillei*

Calyx villous-tomentose; stems puberulous, obtusely angular; leaves narrowly ovate, about 10 cm. long and 6 cm. broad, dentate, finely tomentellous below; corolla well exserted from the calyx .. .. .. .. .. 14. *Pobeguinii*

**Stems creeping, rooting at the nodes; leaves broadly ovate, sparingly crenate, up to 2 cm. long, minutely glandular below; racemes very short and few-flowered; abaxial calyx-lobes sharply subulate and incurved, the adaxial lobe large, with recurved sides 15. *repens*

1. **Coleus koualensis** *A. Chev.* Bot. 519, name only. Erect, 2–3 ft. high, velvety-pubescent.
Ivory Coast: Upper Sassandra, Tourou country, Mt. Dourou summit, 3,400 ft. (May)! Exsicc.—*Chev.* 21715.

2. **C. splendidus** *A. Chev.* in Journ. de Bot. 1909 : 122; Bot. 520. Erect, branched, 1–1½ ft. high, with a few small root tubers, 4-angular puberulous stems and comparatively large bluish flowers; habitat laterite plateaux.
French Guinea: Bilima (Sept.)! Futa-Jallon, Timbo, Ditinn, Irébéléya, etc., 1,800–2,100 ft. (Sept.)! Exsicc.—*Chev.* 15042; 18274; 18297; 18327; 18338; 18480.

3. **C. casamancicus** *A. Chev.* Bot. 518, name only. *Isodichyophorus Chevalieri* Briq. ex Chev. Bot. 524. An erect undershrub with quadrangular stems, whitish-woolly when young; flowers ½ in. long in racemes up to 1 ft. long.
Senegal: Casamance from Farancounda to Tambanaba (Feb.)! Sedhiou (Feb.)! Exsicc.—*Chev.* 2777 bis.

4. **C. reticulatus** *A. Chev.* in Bull. Soc. Bot. Fr., Mém. 8d : 200; Bot. 520. Undershrub 4–6 ft. high, with 4-angled brown-puberulous stems, and bluish flowers ¾ in. long in racemes 4–12 in. long.
French Guinea: Farana, between Kaba and Tonfili (Jan.)! Exsicc.—*Chev.* 20393.

5. **C. djalonensis** *A. Chev.* in Journ. de Bot. 1909 : 123; Bot. 519. *C. Peulhorum* var. *violacea* A. Chev. l.c. 124; Bot. 520. Erect or half decumbent herb, covered with whitish hairs, much-branched, 1–1½ ft. high, with blue or bluish-purple flowers.
French Guinea: Futa-Jallon, Dalaba-Diaguissa Plateau, 3,000–4,000 ft., Boulivel, etc. (Sept.)! Exsicc.—*Chev.* 18347; 18606; 18606 bis.

6. **C. tenuicaulis** *Hook. f.*—F.T.A. 5 : 443. Erect branched slender pubescent herb about 1 ft. high, with flowers ½ in. long in slender lax panicles 6 or more in. long.
Cameroons Mt., 7,000 ft. (Dec.) ! Exsicc.—*Mann* 1939.

7. **C. Peulhorum** *A. Chev.* in Journ. de Bot. 1909 : 123 ; Bot. 519. Erect, branched, rather slender, shortly pubescent, 1–1½ ft. high, with pale bluish flowers ⅓ in. long.
French Guinea : Futa-Jallon, Dalaba-Diaguissa, Timbo, Ditinn, etc., 3,000–4,000 ft. (Sept.–Oct.) ! Exsicc.—*Chev.* 18424 ; 18566 ; 18895.

8. **C. decurrens** *Gürke*—F.T.A. 5 : 427. *C. elatus* Baker. Herb with pubescent stems 3–6 ft. high, fairly large leaves and red or yellow flowers ½ in. long.
S. Nigeria : Oban. Cameroons Mt. : near Buea, 3,000 ft. ! Fernando Po, 2,000 ft. (Dec.) ! Extends to Gabon. Exsicc.—*Mann* 584. *Talb.* 369. *Preuss* 948.

9. **C. dissitiflorus** *Gürke*—F.T.A. 5 : 444. Perennial herb with glandular-pubescent stems up to 3–4 ft. long, and blue-purple flowers ¾ in. long.
Cameroons Mt. : between Buea and Bimbia ! Exsicc.—*Preuss* 1055.

10. **C. dysentericus** *Baker*—F.T.A. 5 : 437. *C. salagensis* Gürke ? *C. pallidiflorus* A. Chev. Bot. 519. *C. rotundifolius* A. Chev. et Perrot in Chev. Bot. 520 ; Holl. 3 : 531. *Plectranthus Coppinii* Cornu. Erect branched nearly glabrous herb, half-succulent, with 4-angular stems, tuberous roots and bluish flowers.
A cultivated plant from Senegal and French Sudan to Nigeria ! Exsicc.—*Barter* 846. *Johnson* 794. *Dalz.* 103. *Lamb* 67. *Chev.* 2813 ; 14838 ; 18234 ; 18274 bis. (See Appendix).

11. **C. glandulosus** *Hook. f.*—F.T.A. 5 : 425. Slender erect branched pubescent herb, with ribbed stems 2–6 ft. high, and flowers ¼–⅓ in. long.
Cameroons Mt., 2,500–7,000 ft. (Nov., Dec.) ! Exsicc.—*Mann* 1301 ; 1988.

12. **C. dazo** *A. Chev.* in Agric. Prat. Pays Chauds, 4 : 104, and in Chev. & Perrot. Vég. Util. Aft. Trop. Fr. 1 : 126. *C. floribundus*, var. *longipes* Robyns & Lebrun. *C. langouassiensis* A. Chev. Bot. 519. *Plectranthus floribundus*, var. *longipes* N. E. Br. ; Holl. 3 : 530. Perennial with herbaceous erect stems rather coarsely pilose with whitish hairs ; flowers fairly large, yellow, ½–⅔ in. long ; root elongated-tuberous, often cultivated.
French Sudan : Mossi, etc. ! N. Nigeria : Zaria, Kano, etc. (Jan.) ! Bauchi Plateau (Jan.) ! Also in Angola, Upper Ubangi, Congo Basin, Nyasaland and extending to Rhodesia and Natal. Exsicc.—*Dudgeon* 2. *Lamb* 22. *Yates* 48. *Lely* P. 121. *Chev.* 24579. (See Appendix).

13. **C. Caillei** *A. Chev.* Bot. 518, name only. Stout erect undershrub 2–3 ft. high, with bright blue flowers in a solid oblong spike 1–2 in. long.
French Guinea : Longuery (Dec.) ! Exsicc.—*Caille* in *Herb. Chev.* 14684.

14. **C. Pobeguinii** *Hutch. & J. M. Dalz.* in Kew Bull. 1931 : ined. Stout undershrub with woody stem ¼ in. thick, 3–6 ft. high, and rather conspicuous blue or blue-purple flowers ½–¾ in. long in dense oblong heads 1 in. long forming a stiff branched panicle.
French Guinea : Kouroussa, common (Oct.) ! Exsicc.—*Pobéguin* 556.

15. **C. repens** *Gürke*—F.T.A. 5 : 439. *C. carnosus* A. Chev. Bot. 518, incl. var. Pubescent herb, half-succulent, with whitish flowers with purple lower lip.
French Guinea : Konianke country, Fassakoidou (Feb.) ! Guerzé country, between Nzo and Sakonanta, foot of Mt. Nzo (Mar.) ! Ivory Coast : several localities ! Gold Coast : forests of E. Akim (Dec.) ! Cameroons Mt. : forests near Buea ! Exsicc.—*Johnson* 787. *Preuss* 949. *Chev.* 19403 ; 19586 ; 20806 ; 21077.

## 26. **ANISOCHILUS** Wall.—F.T.A. 5 : 446.

Stems narrowly 4-grooved, softly tomentellous ; leaves oblong-lanceolate, slightly cuneate at the base, about 15 cm. long and 4 cm. broad, undulate-crenate, puberulous above, softly tomentellous and closely reticulate below ; petiole 1–2 cm. long ; inflorescence terminal, 3-furcate ; spikes dense, long-pedunculate, cylindric, 6–10 cm. long, 2–2·5 cm. diam. ; calyx campanulate, adaxial lip large, broadly elliptic, forming a hood over the other four small teeth, nervose ; corolla-tube exserted, bent at the middle .. .. .. .. .. .. .. .. .. .. *africanus*

**A. africanus** *Baker*—F.T.A. 5 : 446 ; Chev. Bot. 521. Perennial herb 4–5 ft. or more high, dull ochrey-pubescent, with pale blue tomentose flowers ¼ in. long in dense cylindrical spikes.
French Guinea : Farana, Tagania, and Sulimania (Jan.) ! Sierra Leone : Lomaburn, in alluvium (Feb.) ! N. Nigeria : Kontagora, in a marsh (Nov.) ! Bauchi Plateau, Vom, 3,000–4,500 ft. ! Also in Cameroons, Congo, Shari-Chad and Uganda. Exsicc.—*Sc. Elliot* 5033. *Dalz.* 133. *Dent Young* 213.

## 27. **SALVIA** Linn.—F.T.A. 5 : 456.

Stems white-pubescent ; leaves few, oblong-linear to linear, narrowed to a short petiole or the upper ones sessile, 1–3 cm. long, 2–10 mm. broad, crenate, bullate, scabrid on the nerves ; whorls 2–4-flowered, pedicellate ; calyx 3 mm. long in flower, pubescent or hirsute, upper lip short, concave, with 3 minute teeth, lower lip bifid with acute tips ; corolla glabrous, scarcely 1½ times as long as the calyx .. .. *aegyptiaca*

**S. aegyptiaca** *Linn.* Sp. Pl. 23 ; Chev. Bot. 523. A stiff-branched undershrub, a few inches to 3 ft. or more high, woody below.
Mauritania : N. and N.W. of Adrar, Tiris (Feb.) ! Also in N. Africa to Egypt and N.W. India. Exsicc.—Chev. 25533 ; 28492.

## 28. **HOSLUNDIA** Vahl.—F.T.A. 5 : 377.

Stems minutely puberulous ; leaves paired or ternate, narrowly ovate-lanceolate, long-acuminate, cuneate at the base, about 10 cm. long and 4 cm. broad, crenulate-serrulate, puberulous on the nerves above and sometimes subscabrid, minutely glandular below ; panicle terminal, many-flowered, puberulous ; pedicels slender, articulating at the top ; calyx very small in flower, campanulate, regular, with 5 small teeth, puberulous, enlarging in fruit and berry-like .. .. .. .. *opposita*

**H. opposita** *Vahl*—F.T.A. 5 : 377, incl. var. *verticillata* Baker ; P. Beauv. Fl. Owar. 1 : 52, t. 33 ; Chev. Bot. 515. *H. verticillata* Vahl—Chev. Bot. 516. A weak shrub erect or half-climbing to 10–15 ft., slightly odorous, with small creamy-white flowers in ample panicles and orange-yellow succulent fruit ¼ in. in diameter.
Common from Senegal to Cameroons and Fernando Po ! Bauchi Plateau, 5,800 ft. ! General in tropical Africa and the Mascarene Islands, extending to S. Africa. Exsicc.—*Heudelot* 41. *Skues.* *T. Vogel* 4. *Barter* 298 ; 1729 ; 3323. *Mann* 264 ; 1252. *Sc. Elliot* 5021 ; 5322. *Rowland.* *Cummins* 144. *Brown* 310. *Dawodu* 22 ; 333. *Farmar* 576. *Talb.* 370. *Krause.* *Warnecke* 155 ; 388. (See Appendix).

# FLORA

OF

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